AVIATION WEEK

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AVIATION WEEK

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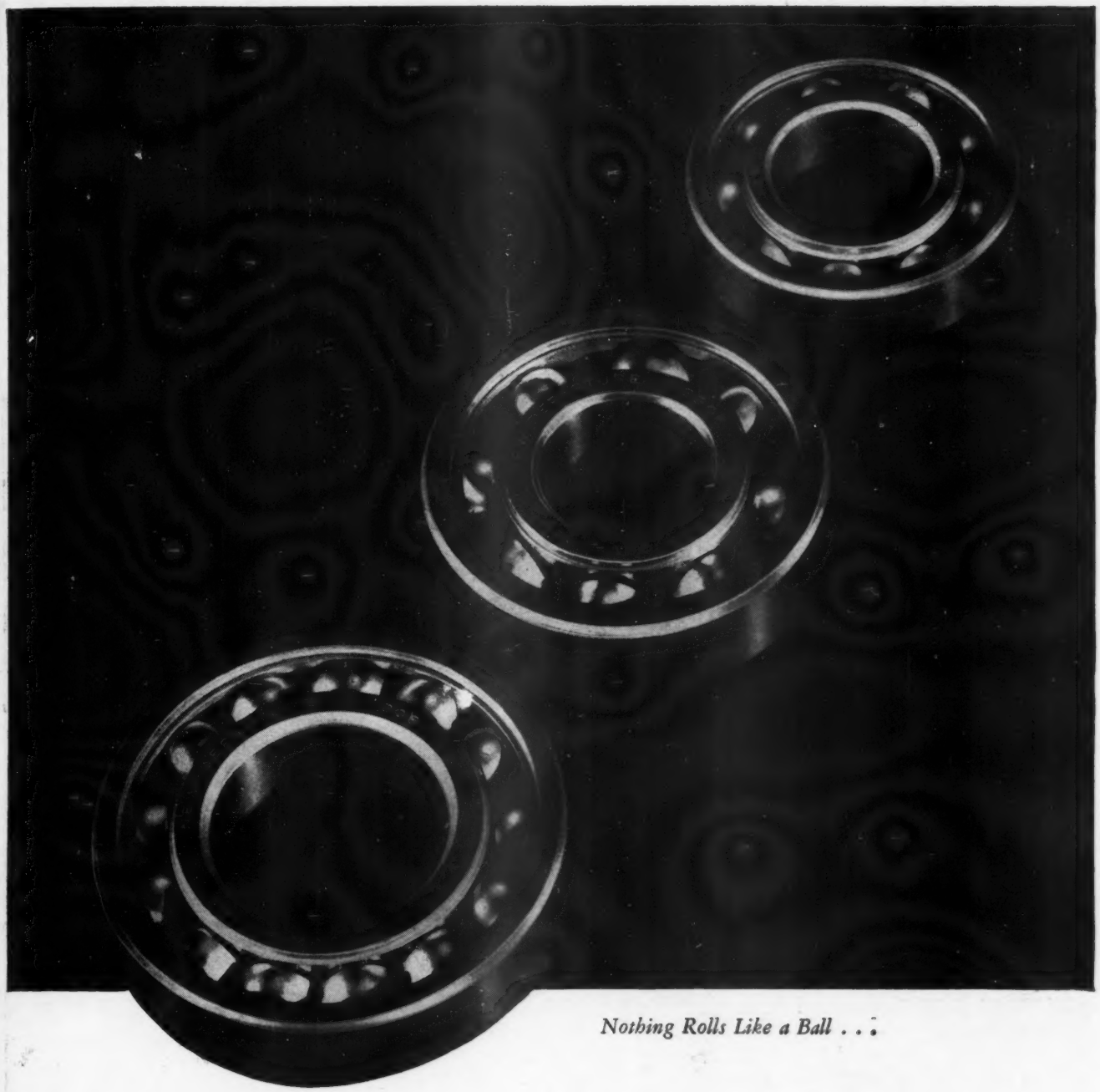

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THE AVIATION WEEK

The Airfreight War

While CAB still totters uncertainly down a tortuous road to a decision on the status of noncertificated cargo carriers, it has fallen even farther behind events as these lines have received new Government recognition in a highly important quarter with Secretary of Air Symington's decision to use two uncertificated operators to move dependents of Army personnel.

This action is likely to portend far more important developments. It gives these carriers a measure of prestige they have not had before—considering that the two lines involved got their part of the business in an open fight with the certificated lines represented by Air Transport Association. Yet with that pestige goes a responsibility that is shared by all the noncertificated lines.

They must clean house—and fast—by discontinuing practices which, in addition to chipping away the foundation of friendship they recently have won, are frowned upon by the more far-sighted operators.

Indifferent maintenance, flying in violation of safety regulations, marginal passenger-carrying "contract" operations, if continued, quickly could wreck a future that bears several bright promises of increased Government business.

ATA ON WARPATH—Present sloppy procedures on the part of some minor elements among the noncertificated carriers eventually would alienate all the friends in Congress and the press that the carriers have made in recent months. But the situation has been rendered acute by the fact that ATA has launched an all-out attack against its uncertificated competitors.

At their annual meeting in December, ATA members unanimously adopted a motion instructing its staff to push a bill to provide far more stringent Federal regulation on contract carriers.

In addition to the issue they made of the transportation of dependents, the certificated airlines made a significant move at the recent CAB oral argument on exempting all-cargo carriers between Alaska and the U. S. from the Economic Regulations.

Besides the proposed Alaskan exemption, the certificated lines challenged the Board's authority to promulgate Section 292.1 (the nonscheduled exemption) and Section 292.5 (the domestic airfreight exemption), and the proposed exemption of freight forwarders.

The angle arousing intense interest is that 292.1 has been in effect since before the war, and 292.5 since last summer. Still, the attacks on their legality were the heaviest of all.

CAUSE FOR COMPLAINT—ATA has plenty of cause to gripe about lack of enforcement of the nonscheduled regulation (Section 292.1), especially on the Pacific Northwest-Alaska and the New York-Puerto Rico runs. Bad accidents, plus flagrant and frequent violations of both economic and safety regulations by noncertificated lines in those areas have reflected on the scheduled carriers.

Cut-throat fare policies and cheap and haphazard maintenance also have hurt the other passenger-carrying nonscheduled and contract lines that are trying to obey the rules.

Pointing up the fact that correction of these conditions is a job for the noncertificated lines themselves is the statement by CAB's enforcement and litigation division that it does not have the personnel to prosecute violators of the nonscheduled exemption. After the Burke Air Transport crash in Florida last fall, CAA said it did not have enough inspectors to police the nonscheduled carriers.

Another indication of the result of poor operations and judgment on the New York-Puerto Rico run has just come to light. Pan American Airways filed a tariff with CAB increasing fare from New York to San Juan by about 15 percent. The tourist advisory board of the insular government of Puerto Rico sent the Board a protest which read in part: "Establishment by PAA of higher fares will undoubtedly result in diverting more passengers from the certificated carriers to the uncertificated lines whose history of performance is not one to inspire confidence on the part of the traveling public."

A year or so ago the Puerto Rican government was vigorously backing nonscheduled and contract carriers.

GOOD WITH THE BAD—In the face of such factual evidence of how support can be replaced by opposition, even from some of the most ardent boosters, it is little wonder that the non-certificated carriers are giving deep thought to the mavericks in their ranks.

There are some noncertificated carriers with outstanding records—Seaboard & Western, Pacific Overseas, Transocean, Flying Tigers—the last three of which have performed extensive contract work for the Government with perfect safety marks.

If the noncertificated lines can set their own house in order they should be in a position to benefit from heavier Government assignments in the future. They have a deep reservoir of good will in the Army and Air Force whose officials quietly point out the immense value of a widespread cargo network in case of an emergency.

If the need arose, the noncertificated lines could turn their full organizations over to the Government service on briefer notice than could the scheduled airlines, with their involved ownership and commitments. But if public opinion were aroused over the faults of the few, the solid achievements of the many also would suffer. And it is questionable how much business the Government would dare give the noncertificated operators.

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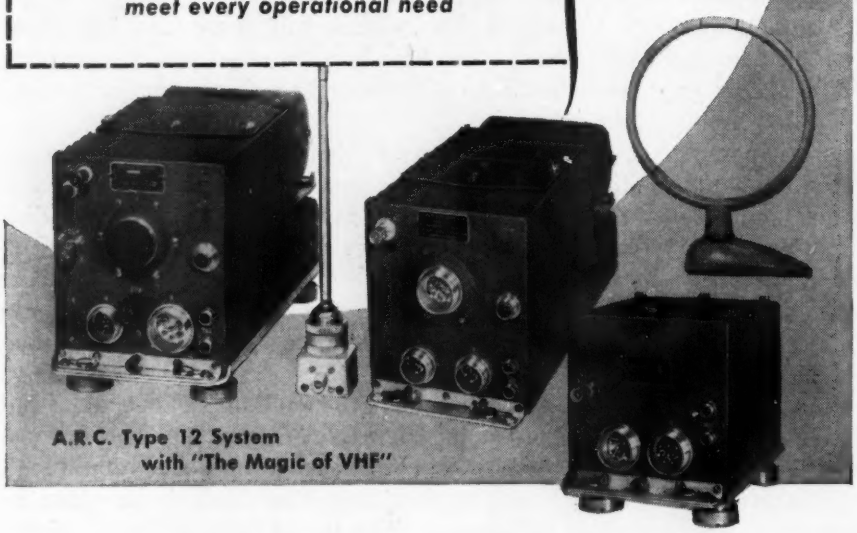

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NEWS DIGEST

DOMESTIC

National Airline pilots struck early last week, further crippling operations which had already been affected by a three-week walkout of clerks and mechanics. David L. Behncke, president of the Air Line Pilots Association, said the action was taken after two "almost unanimous strike votes," and climaxed two years of poor pilot-management relations.

John R. Alison was confirmed as Assistant Secretary of Commerce for Air by the Senate, having served in the office since his Presidential appointment during a Congressional recess.

Vice Admiral John Dale Price, recently named Deputy Chief of Naval Operations (Air), received appointments on the National Advisory Committee for Aeronautics and the Research and Development Board.

Civil Aeronautics Board confirmed earlier reports that fuel leakage from a transfer operation between No. 3 and No. 4 tank entering the cabin heater air intake of the United Airlines Douglas DC-6 had probably caused the fire that resulted in the Bryce Canyon, Utah, disaster.

Col. Virginius Evans Clark, former chief aeronautical engineer of the Army in 1915, died at Santa Monica, Calif., at the age of 61. Clark created the famous series of airfoils bearing his name and designed numerous aircraft. One of the founders of Consolidated Vultee Aircraft Corp., he most recently was an expert on Duramold aircraft structure, serving as consultant to Hughes Aircraft Corp.

FINANCIAL

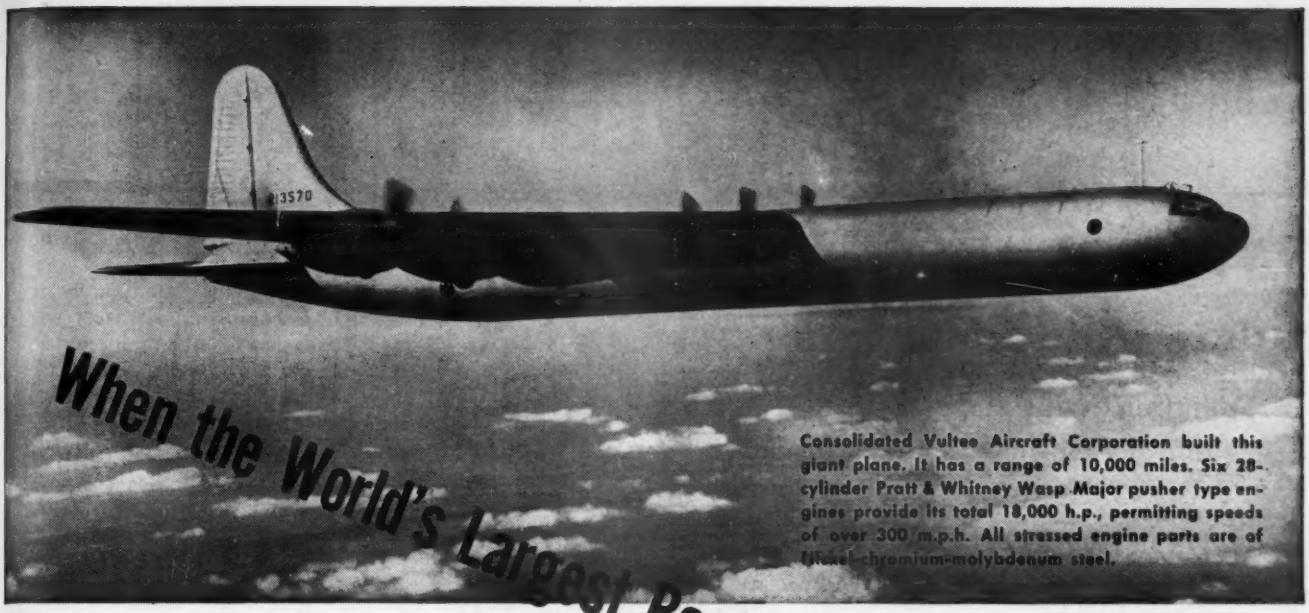
Link Aviation, Inc., Binghamton, N. Y., has paid $427,462.19 in back taxes to the Federal Government which in turn has dismissed a lien against the firm.

FOREIGN

Canadian war ace Gordon R. McGregor of Montreal has been appointed president of Trans-Canada Air Lines, succeeding H. J. Symington.

Brazilian airlines completed a full year of service without a single passenger fatality Jan. 4, 1948. Using American equipment, the Brazilian airlines fly an annual passenger mileage second only to the U. S. in the entire world.

British granted authority to the United States government for the use of Royal Air Force fields at Castel Benito near Tripoli, Libya and Luqa on Malta. The agreement was reached at U. S. request but the fields will remain under R.A.F. control.



Consolidated Vultee Aircraft Corporation built this giant plane. It has a range of 10,000 miles. Six 28-cylinder Pratt & Whitney Wasp Major pusher type engines provide its total 18,000 h.p., permitting speeds of over 300 m.p.h. All stressed engine parts are of Nickel-chromium-molybdenum steel.

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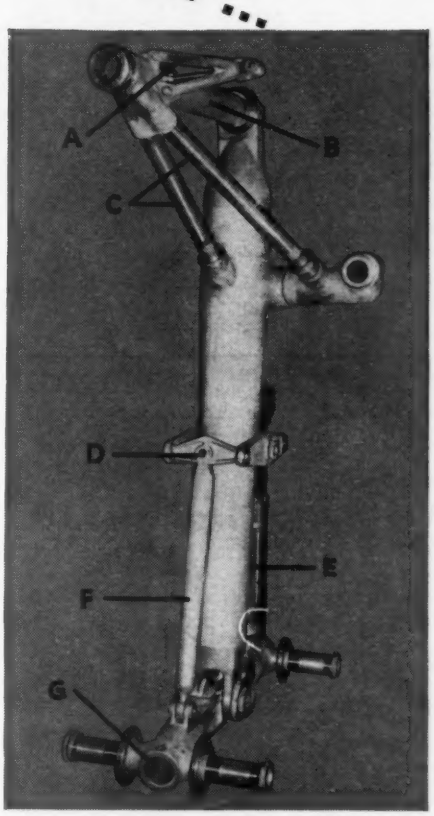

Cleveland Pneumatic Tool Company, producer of landing gear assemblies for the B-36, use Type 4340 Nickel-chromium-molybdenum steel for the following major parts: A—Jack Lever, B—Pivot Tube, C—Drag Braces, D—Cross Beam, E—Aerol, F—Fixed Link, G—Axle Beam.

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AVIATION WEEK

Feb. 9, 1948

NATS and ATC Are Merged Into Single Military Transport Service

Maj. Gen. Kuter slated to head new command with Rear Admiral Whitney as deputy; details hinge on route survey.

By ROBERT HOTZ

Merger of the Air Force Air Transport Command and the Naval Air Transport Service into the Military Air Transport Service has been ordered by Secretary of Defense James Vincent Forrestal, effective Mar. 1.

Maj. Gen. Laurence Sherman Kuter, now U. S. delegate to ICAO and formerly commander of ATC's Atlantic division, was named to head MATS with Rear Admiral John Perry Whitney, Navy General Board member and formerly chief of staff and director of NATS who will be Kuter's deputy in command. Rear Admiral John Walter Reeves, Jr., commander of NATS was originally offered the top MATS post but declined.

▶ **Detailed Plan**—Forrestal's initial merger order is only the beginning of actual consolidation of the two transport services, long a target of Congressional economy advocates. Significant details of the merger will be worked out by the MATS commander and his deputy subject to approval of the Secretaries of the Air Force and Navy. Present plan is for Kuter and Whitney to make a survey of all ATC and NATS routes and then draw up a detailed plan for consolidating all scheduled transport operations over trunk routes. This plan will be submitted for approval to Air Force Secretary Stuart Symington and Navy Secretary John Sullivan before final implementation by Forrestal.

MATS will be administered through the Air Force. Earlier consideration had been given to putting MATS under the joint chiefs of staff. The merged transport services will be charged with providing scheduled air transport for the Army, Navy and Air Force.

▶ **Compromise Made**—Forrestal's merger order is a compromise between the ATC desire to absorb all military air transport and the Navy's stand that NATS should be preserved as an independent unit. Navy can be expected to continue its fight to preserve NATS identity within the structure of MATS by assignment of NATS aircraft and personnel to operate specified routes as a unit. Navy's argument is that only in this manner can any comparative yardstick of operational efficiency be maintained and the Navy provided with an air transport nucleus that could be expanded to meet tactical wartime needs.

Comparative efficiency of NATS and ATC has been a bitter bone of contention during merger negotiations. Admiral Reeves presented statistics to the Congressional Air Policy Board, showing that for the first six months of 1947 NATS carried 14 percent less traffic than ATC with only one-third of ATC's personnel. ATC says 10,000 of its 21,000 personnel are employed in regular base services and only 8,300 in direct transport operations.

▶ **Routes Listed**—ATC currently operates 76,400 route miles through its Atlantic and Pacific divisions. Plans are now under way to link the Pacific terminal at Manila with Dahran, Arabia, now the eastern terminal of the Atlantic division. NATS operates 40,000 route miles with Shanghai, Manila and Tokyo as its Pacific terminals.

NATS recently re-opened its Atlantic run to Port Lyautey, Morocco and planned a Mediterranean extension as far as Athens to service fleet units now in Middle Eastern waters.

Both services have good safety records. NATS completed last year without a passenger fatality and one crew fatality in 495,893,175 passenger miles. ATC had no fatalities in 501,960,123 scheduled passenger miles but killed 14 passengers and 21 crewmen in crashes on unscheduled flights.

▶ **Planes Listed**—NATS operates 116 aircraft, principally C-54s and including 4 Martin Mars (JRM) flying boats. Navy crews will continue to operate the Mars fleet under MATS. Future development of large transport flying boats will continue to be the Navy's responsibility. Some top Navy strategists believe giant flying boats or radically new designs will play an important role in supply of carrier task forces at sea. ATC operates 380 planes principally C-54's. NATS was scheduled to receive two Lockheed Constitutions, double decker transports and a Wasp Major powered Mars (JRM-2). ATC's new planes on order include 10 Douglas C-118 (DC-6), five Douglas C-74s, and 17 Boeing C-97 Stratofreighters.

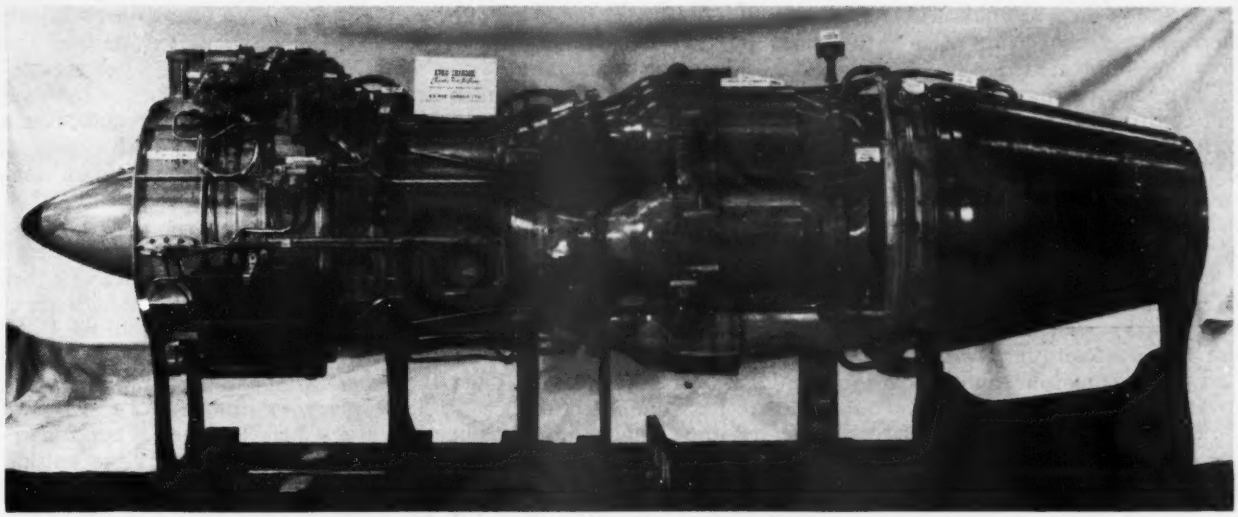
For the first six months of 1947 NATS reported an aircraft utilization of 7 hours per day for C-54s and 9 hours per day for JRMs. A load factor of 85 percent was maintained. No similar figures were available from ATC.

Consolidation of the military air transport services is expected to facilitate joint military-civil development of new type cargo planes along the lines suggested by Maj. Gen. Hugh Knerr elsewhere in this issue. Few if any economies, the main objective of the transport merger, will be effected for some time, probably not until after approval of the detailed operational plan which is to be submitted by Kuter and Whitney.

Military Transport Services

	NATS	ATC*
Route miles	40,835	76,400
Passenger miles	495,893,175	501,960,123
Cargo ton miles	44,992,067	72,000,000
Total ton miles	98,770,966	130,246,130
Planes	116	380
Personnel	6,300	21,000

* *All statistics for 1947 calendar year.*



CANADIAN CHINOOK TURBOJET

A. V. Roe Canada, Ltd. will begin initial tests of the "Chinook," axial-flow turbojet engine shown above, early this spring. Designed and built in Canada, the new engine is expected to develop 2590 lb. static thrust at a weight of 1250 lb. It has nine stages of axial flow compression, six combustion chambers and a single stage turbine. It will power a new A. V. Roe jet fighter being designed for the Royal Canadian Air Force and a four-engine jet transport. Production is not scheduled for about two years.

Foreign Airport Program Faces Rough Sledding in Congress

Air Coordinating Committee proposal urges airport rehabilitation to aid international airlines of United States; Brewster scores inadequate facilities.

Air Coordinating Committee's program to secure the dominant position of U. S. international air transport services through construction and operation of a world-wide system of airports and other facilities faces—at best—an uncertain future in Congress.

Legislation implementing the ACC program, introduced by Rep. Charles Wolverton, is stymied in the House Interstate and Foreign Commerce Committee for at least another month. Wolverton is chairman of the group.

After two days of hearings during which the measure was indorsed by ACC, Civil Aeronautics Administration, Weather Bureau, Army Air Force, and —with minor reservations—by Air Transport Association, Wolverton agreed to withhold further action until the Joint Congressional Aviation Policy Board issues its report laying down an over-all peacetime air power program Mar. 1.

▶ **Brewster Report**—While the Joint Aviation Policy Board blocked action on the overseas aviation facilities bill, the Board's chairman, Sen. Owen Brewster (R., Me.), issued a one-man report deploring the inadequacy of overseas facilities in the Europe-Near East area and calling for immediate and concerted effort to improve them. A report issued by House Interstate and Foreign Commerce Committee last week on Alaska's transportation system urged development of airports and navigation aids in the territory.

In filing his report, Brewster jumped the gun on House Interstate and Foreign Commerce Committee which, for several months, has been readying a report on aviation facilities in the Europe-Near East area. Members of the committee made an on-the-spot survey during the summer Congressional recess. Brewster later took time out from his duties as a delegate to ICAO, convening in Geneva, to do the same.

▶ **Airports Inadequate**—The inadequacy of airports, most of which are without hard-surfaced runways, and the lack of navigation facilities in the Europe-Near East area, Brewster's report stated, points "to the necessity of vast expenditures for . . . development during the next few years if air transport is . . . to occupy anything like the significant position which it is rapidly assuming in the United States." Factors highlighted:

• Even the great Templehof Airdrome in Berlin lacks hard-surfaced runways.

• Commercial services to Greece are "at the point of being abandoned" because of the "deplorable condition" of the Athens airfield.

• Although Turkey has funneled $20 million of its U. S. loan for aviation facilities, its main airport at Istanbul still is deficient in navigation and landing aids.

• Satisfactory arrangements for utilization of the Farouk Airport at Cairo, the key stepping stone of the Near East area, have not been obtained by TWA, although the U. S. constructed the port during the war.

Two-fold purpose of the aviation facilities bill, drafted by Air Coordinating Committee and introduced by Wolverton:

• **To give CAA permanent authority** to construct and operate overseas aviation facilities. CAA is now operating facilities turned over to it by the armed services after the war by virtue of Executive Orders issued under the first War Powers Act, slated for early revocation by Congress.

• **To vastly expand** the U. S.'s program of overseas aviation facilities by giving virtually blanket authority to the U. S. delegate to ICAO, the CAA, and the State Department, working cooperatively, to make the best arrangements possible, either through ICAO or independently, for acquisition, construction, maintenance, and operation of overseas facilities.

▶ **ICAO Agreement**—The convention establishing ICAO requires member states to provide air navigation facilities and services required in its territory by international civil aviation "so far as it may find practicable." If member states cannot meet requirements for

facilities and services in their territories —and most of them cannot—ICAO is authorized to designate an "agent" to perform required activities on its behalf. The "agent" would be responsible for all construction, installation, operation, training, or other work involved in bringing facilities and services in the territory concerned up to the international standards.

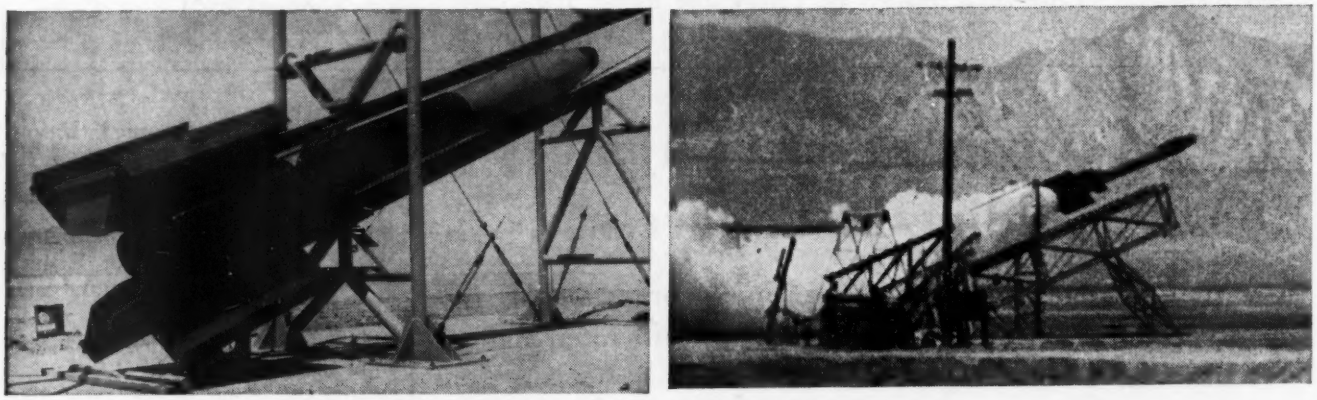
The Wolverton bill would authorize the CAA to act as an "agent" of ICAO, or directly to undertake international aviation facilities programs—where this was consistent with ICAO policy. CAA would be authorized to train foreign nationals to operate air facilities and to negotiate for the transfer of U. S.-developed facilities to foreign governments, if and when practicable.

The ICAO convention provides that international aviation programs undertaken by its "agents" are to be financed from ICAO funds, through contributions by the states interested in the establishment of the facilities.

▶ **Congress Is Wary**—Congressmen are wary, however, that the Wolverton bill would result in the U. S. financing all but an infinitesimal amount of a worldwide aviation facilities development program. Rep. Carl Hinshaw (R., Calif.), vice chairman of the Joint Aviation Policy Board, pointed out there would be no restrictions on the U. S. ICAO delegate in committing CAA to act as an ICAO "agent" and in committing the U. S. to finance projects. Once the delegate has committed the U. S., he objected, the Congress would be bound to appropriate funds to maintain the good faith of the U. S. Similarly, Hinshaw pointed out, CAA, with the approval of the State Department, would have a free hand to commit the U. S. in direct negotiations with foreign governments on aviation developments.

Members of Interstate and Foreign Commerce, following hearings on the ACC-drafted bill, were generally antagonistic to the idea of further burdening the U. S. Treasury, which already is hard put to meet requirements for domestic aviation facilities. Conclusion of the Brewster report is that international aviation facilities should be developed and financed by the U. S., eitheir directly or indirectly—through economic reconstruction loans from the U. S.

Brewster favored direct U. S financing. Although the Brewster report dealt only with Europe and the Near East, the same set of factors appears to exist in China and other areas outside the "iron curtain" where there are U. S. transport services. These countries would be able to finance adequate facilities only with U. S. reconstruction loans.



NAVY FLIES LARGEST RAM JET

Navy unveiled its new supersonic ram jet last week at its Inyokern, Calif., rocket test center. Built by Aerojet Engineering Corps with fuel system by Bendix Aviation Corp. and technical assistance from the Applied Physics Laboratory of Johns Hopkins University, the ram jet is shown (left) at rest on its launching ramp with Monsanto solid fuel booster rocket attached. At right the ram jet is being kicked off the ramp by the rocket booster which brings the engine up to supersonic speeds before dropping off and leaving the ram jet to continue under its own power. (Navy photos)

Navy Boosts Ram Jet Power

Aerojet Engineering Corp.'s 15-in. model shows results of wind tunnel test progress.

Navy reveals that the first practical wind tunnel tests of ram jet engines have approximately doubled their efficiency and flight tests of the most recent Navy model at supersonic speeds has confirmed these research findings.

The new Navy engine, approximately 15 in. diameter and weighing about 150 lb., develops about 2,650 lb. of thrust at 1,500 mph., and is claimed to be the largest ram jet ever flown at supersonic speed. The device produces about 25 lb. of thrust per pound of weight, a figure 100 percent better than previous test articles, which averaged about 12.5 lb. thrust per lb. weight.

▶ **Wind Tunnel Tests**—These important increases in efficiency have been achieved through wind tunnel tests at the Navy's ram jet laboratory near Daingerfield, Texas, operated by Consolidated Vultee Aircraft Corp. Ram jet combustion research has been delayed by the impracticality of operating a ram jet engine within a continuous flow closed type wind tunnel due to the problem of exhaust gases filling the tunnel. The Daingerfield facility is a converted steel mill containing two large bessemer blowers. Under the direction of Applied Physics Laboratory (Johns Hopkins University), these blowers were converted into supersonic jets into which "live" ram jet engines can be placed and fired under simulated supersonic flight conditions.

The new engine has been test flown at the Naval Ordnance Test Station, Inyokern, Calif., in the Mojave Desert. The engine is accelerated to the threshold of sonic speed by a large solid fuel rocket motor developed by the Aerojet Engineering Corp., Azusa, Calif. At this speed, the ram jet engine develops sufficient thrust to sustain itself in flight and the "booster" rocket drops away. Experimental ram jets were built for the tests by the Cornell Aeronautical Laboratory. Fuel control systems were developed by Bendix Aviation Corp.

This latest engine is the most recent in a series developed under "Project Bumblebee," which consists of the joint efforts of a large number of universities and industrial research groups. Larger and more efficient supersonic ram jet engines are under development as powerplants for a family of guided missiles being developed by the Navy Bureau of Ordnance under the administrative supervision of the Applied Physics Laboratory. Henry H. Porter is in charge of the guided missile research project and Wilbur H. Goss is responsible for the ramjet engine research work.

Joint Air Cargo Deal Proposed

Partnership between Air Force and independent air freighters urged by Gen. Knerr.

A working partnership between the Air Force and the independent air-freight operators is proposed by Maj. Gen. Hugh J. Knerr, Air Force Inspector General, who believes that the Air Force should share the development costs of new all-cargo aircraft with the uncertificated cargo carriers. Such a plan, he believes, would "start the snowball on its way" toward tapping the nation's air cargo potential and simultaneously providing the Air Force with a reservoir of cargo aircraft for use in a national emergency.

A major consideration in the new plan is the preservation of the scheduled airlines for passenger carrying during an emergency, an essential activity that under present circumstances would have to be absorbed by the military due to a shortage of transport aircraft. By the same token, Gen. Knerr sees no reason for Air Force development of passenger carrying transports designed for scheduled airline operation.

▶**Air Force View**—Gen. Knerr, generally recognized as one of the Air Forces outstanding military philosophers, believes that a cargo aircraft suitable for both commercial and military use can be developed provided the needs of the commercial user are considered of major importance. There is no reason, he writes, why the design could not contain provisions for special removable reinforcement for the cargo flooring to accommodate high-density military loads. Provisions for anchorage and tie down facilities could also be included to permit installation only for military operations.

He visualizes three general cargo transport sizes:

- Large with 50,000 lb. payload.
- Medium with 20,000 lb. payload.
- Small utility or feeder type of 10,000 lb. payload.

For capacities larger than 50,000 lb. would require specialized features suitable only for military operation. These features include "pod" fuselages, detachable for speed in ground handling, track landing gears, special cold weather operating equipment.

By utilizing these convertible types, Gen. Knerr believes that the uncertificated carriers could quickly generate a cargo industry supporting thousands of employees and utilizing several hundred cargo aircraft. This, in turn, would drop the ton-mile costs down to less than six cents for a gross handle of four or five billion ton-miles per year.

Gen. Knerr's proposal agrees closely with the recommendations of the President's Air Policy Commission, which proposed the creation of an aircraft development corporation to finance new cargo aircraft by the government.

Orville Wright's Death May Return Kitty Hawk Plane to U. S. Museum

Inventor's will expected to resolve fate of plane that made first flight; biplane now in British museum.

By ALEXANDER McSURELY

The first Wright brothers plane, after a 20 year sojourn in England, is expected to be returned to this country soon.

In one of the last interviews before he became ill last fall, Orville Wright, 76, first man to fly and co-inventor of the airplane, told AVIATION WEEK that he planned to bring the Kitty Hawk plane back from the Science Museum at South Kensington, near London, where it had been on exhibit since 1928.

▶**British Report**—Curator M. J. B. Davy, at the Science Museum, cabled AVIATION WEEK last week that the Wright plane was loaned on an indefinite basis and carried no instructions as to disposition in the event of Orville Wright's death. He had not received any request for its return to America. He believes disposition of the plane will depend on the Orville Wright will, which has not yet been made public. In the event the original plane is withdrawn a replica built by students of the de Havilland Aeronautical Technical School is virtually completed except for fabric covering, and will be ready to take its place.

Miss Mabel Beck, secretary to Orville Wright, told AVIATION WEEK that an announcement regarding the disposition of the plane would be forthcoming soon.

▶**Died in Sleep**—Orville Wright died in his sleep at Miami Valley Hospital in Dayton, Jan. 23 at 10:40 p.m., 36 years after the death of his brother Wilbur, in 1912. Orville Wright had suffered two heart attacks, one in October and a second in January a few days before his death. Miss Beck had found him unconscious in his office after the second attack and he was taken immediately to the hospital. Death was attributed to a lung congestion and the heart attacks. He was buried in Dayton's Woodland Cemetery beside the body of his brother.

In an odd coincidence, the last survivor of the three Coast Guardsmen who aided the Wrights in their historic flight, died at Norfolk (Va.) Hospital Jan. 31, the day after Orville Wright's death. He was Capt. John T. Daniels, 74, of Manteo, N. C., who had held down one of the wings of the first plane before it was ready for its first takeoff.

▶**Last Interview**—It was a warm September evening when Orville Wright last received the writer in his hill-top home in Oakwood, Dayton suburb. The hum of an electric fan was a background noise for our conversation and after a little while Mr. Wright brought out a pitcher of cold lemonade. A small white lamp whose base was a parachuting flyer statuette, with his canopy for the shade, cast a soft light. It was one of countless aviation souvenirs and historic trophies of early competitions, with which the Wright home was filled.

▶**Wright Told Plan**—He had declined to attend an aviation dinner that night. He regarded his rare appearances at public functions as something to be endured only when absolutely necessary. The old back injury which he had suffered in the 1908 crash of the first military plane, in which Lieut. Thomas Selfridge was killed, was giving him some pain.

On that night he side-stepped gentle pressure for a specific time at which he might bring the first plane back. "I plan to bring it back when I am satisfied with conditions affecting it, in this country," he said, and changed the subject. We talked about a wide variety of subjects and finally against protests, he insisted on getting his car out of the garage and driving the writer down to his hotel after the interview.

It was the third time he had indicated to the writer that he intended to bring the plane back, although he never was satisfied with the lack of facilities for its display in this country if it was returned. He showed keen interest in the postwar planning for the National Air Museum in Washington and presumably if the plane is returned it will be exhibited there when the museum is built.

▶ **Langley Controversy**—Five years before, the writer had interviewed him about his opinion of Dr. C. G. Abbot's 1942 Smithsonian Institution paper on the 1914 flights of the Langley Aerodrome.

The paper was a retraction of previous statements by Smithsonian officials which had indicated that the plane of Dr. Samuel P. Langley had been capable of flights before the Wrights' plane. The Langley plane had failed in two attempts at flight in 1903, the last one only nine days before the successful Wright flights.

The Abbot paper accepted a list of changes which Orville Wright had discovered had been made in the Aerodrome under direction of Glenn Curtiss and Albert Zahm, before Curtiss managed to fly it for five seconds years later, in 1914, at Hammondsport, N. Y.

Mr. Wright said at that interview that he was not completely satisfied with the Abbot paper, but that if it had wide publication and enabled historians to correct inaccurate statements stemming from the earlier Smithsonian reports that the Aerodrome had been the first plane capable of flight, he found the retraction acceptable.

▶ **Wright Biplane**—The 12-hp. twin propeller Wright biplane which made man's first flights had been restored years after the 1903 flights, by Orville Wright, with the help of the original drawings. After the fourth and longest flight had been completed by Wilbur Wright, the plane while resting on the ground was overturned by a high wind and damaged too seriously for additional flights.

▶ **Collier Trophy**—Orville Wright was awarded the Collier Trophy in 1913 for his development of an automatic stabilizer which came into wide use. He sold the original Wright Company in 1915 to an eastern syndicate and thereafter devoted his time to aeronautical research and consulting engineering.

He developed the first split type flap for an airplane, to slow down the "too hot" landing speed of the Dayton Wright Alert (Army designation XPS-1). And on the same plane built in the early '20's he designed an efficient completely inclosing engine cowling, which preceded other cowling developments by several years.

He was consulted frequently even in recent years in development of new and larger wind tunnels, and was active in the NACA and in World War II in the National Inventors' Council.

He enjoyed working with machine tools up until shortly before his death, and in the non-aeronautical field developed, among other devices, a highly efficient phonograph record changing device, unlike anything that is yet on the market, and a decoding machine which was capable of deciphering automatically over a million different combinations.

Switch to U. S. Planes Predicted

Brewster reports dissatisfaction with British transports to open export market.

Early abandonment by Great Britain of its "Buy British" aircraft policy, opening the way for purchases of transport planes from U. S. firms, is predicted by Sen. Owen Brewster (R. Me.).

Brewster indicated that a report to the British government by a parliamentary committee which has just completed an extended study emphasizes the inferiority of British transport types and recommends against continued procurement of them by the BOA.

▶ **Policy Shift Seen**—On the basis of the parliamentary report, Brewster reported, "Some of the responsible aviation authorities in Britain" disclosed in conversations with him "the likelihood that Britain might decide for the present to give up the policy adopted last May of not procuring planes from across . . ."

(In London, a spokesman for the British Ministry of Civil Aviation declared last week that his country's policy of not purchasing U. S.-built commercial aircraft has not been altered and probably will not be in the near future.)

Brewster's prediction of British plane purchases from U. S. firms in the near future was contained in a one-man report by the Maine senator on the European air transport situation. The report amounted to an all-out confession by the solon that his past propheting that U. S. overseas airlines, competing among themselves, would lose out to foreign chosen instruments was in error.

▶ **Losses Compared**—"The loss of $20 million by American commercial airlines in a recent 12-month period looks less serious," the report commented, "when compared with the $40 million loss of the government-owned lines of Britain, with all the other countries of Europe still to be heard from." Losses of BOAC, parent company of all British airlines, are running at $240 per passenger, he observed, primarily because of the carrier's out-moded and uneconomic aircraft. Although Great Britain is hard-pressed for dollars, aviation circles here see purchase of U. S. transport planes as the only method of overcoming BOAC operating losses.

A. W. 52 WING IN FLIGHT

First flight closeup of Armstrong Whitworth A.W. 52 jet propelled flying wing type reveals clean, simple lines. Vertical fins are rudders used for directional stability and control. Rolls-Royce Nene turbojet engines, developing 5,000 lb. static thrust, are mounted in streamlined nacelles adjacent to the crew nacelle. Craft utilizes boundary layer control to provide low speed landing characteristics. Extensive flight test and research program is under way. (British Combine photo)

AVIATION CALENDAR

Feb. 9-10—AIA National Aircraft Standards committee, steering committee, Statler Hotel, Washington.

Feb. 10—AIA National Aircraft Standards committee council meeting, Statler Hotel, Washington.

Feb. 11-12—AIA National Aircraft Standards committee eastern division, Statler Hotel, Washington.

Feb. 12-13—Government-industry meeting on AN-3 bolts, Aeronautical Board office, Gravelly Point, Va.

Feb. 13—Air Transport Command reunion, Waldorf Astoria, New York.

Feb. 16-17—Second annual Purdue Airport and Fixed Base Conference, Purdue University, West Lafayette, Ind.

Feb. 17-19—ATA meterological committee, Peabody Hotel, Memphis.

Feb. 26-27—Louisiana Aviation Conference, Shreveport.

Mar. 3-4—Government-industry meeting on self-locking nuts, Wright Field, Dayton, Ohio.

Mar. 5—Government-industry meeting on magnetic inspection of nuts and bolts, Wright Field, Dayton, Ohio.

Mar. 8—ICAO maps and charts division, Brussels.

Mar. 12—AIA airworthiness requirements technical committee, western division meeting, AIA office, Hollywood, Calif.

Mar. 18-19—California State Aviation Conference, Hollywood Roosevelt Hotel, Hollywood.

Mar. 19—National flight propulsion meeting, Institute of the Aeronautical Sciences, Hotel Carter, Cleveland.

Mar. 22—ICAO aeronautical maps and charts division, Brussel.

Mar. 28-31—Annual conference, Society of the Plastics Industry, Santa Barbara, Calif.

Mar. 30—ICAO personnel licensing division, Montreal.

Mar. 30-Apr. 1—Air Transport Association engineering and maintenance conference, Continental Hotel, Kansas City.

Apr. 1-3—American Institute of Electrical Engineers, Des Moines.

Apr. 4-8—American Association of Airport Executives, Congress Hotel, Chicago.

Apr. 20—ICAO rules of the air and air traffic control division, Montreal.

April. 24—Dedication of Skyway 1 and 11 and dedication of CAA aeronautical center, Oklahoma City.

Apr. 27—ICAO facilitation division, Europe.

Apr. 28-30—American Institute of Electrical Engineers, northeastern district meeting, New Haven, Conn.

May 12-15 — Aviation Writers Association, 10th Annual Convention, New York City.

June 1—ICAO second assembly, Palais Des National, Geneva, Switzerland.

June 14-15—Airlines Medical Directors Association, annual meeting, Royal York Hotel, Toronto.

June 15-17—Airport management conference, College Station, Tex.

June 16-18—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.

June 21—American Society for Testing Materials, annual meeting and exhibit, Detroit.

June 22-23—Third annual state aviation clinic, Bowling Green, Ohio.

INDUSTRY OBSERVER

► **Bell Aircraft Corp. is now scheduled to deliver its swept-swing, stainless steel XS-2 rocket research plane to the Air Force late this year. Meanwhile flight tests of the two Douglas D-558-1 turbojet planes have been proceeding at Muroc with Navy and NACA test pilots at the controls. More than a score of high speed flights have been made with both planes.**

► Curtiss-Wright Airplane Division is in production on the KD2C-1 "Skeet" pilotless aircraft, now undergoing tests at Point Mugu, Calif. It is described as "the best thing in its line available to the Navy."

► **North Atlantic Division of the Air Transport Command claims a record of no passenger fatalities during 141 million passenger miles flown during 1947. However, an ATC C-54 crashed on take-off at Goose Bay Labrador last Dec. 10 killing 23 passengers and crewmen and injuring six passengers. ATC does not include these passenger fatalities in the Atlantic division record because the flight was "nonscheduled."**

► Sweden has placed another large order for de Havilland Vampire jet fighters. New order is for the Mark III version with increased fuel capacity and wing rocket launchers. Swedes are also building the de Havilland Ghost, Britain's latest jet engine.

► **Lockheed's "Saturn" feederliner project has gone back on the shelf. The reason—no market. Lockheed had high hopes last fall that improved performance with newly-installed Wright C-7 800 hp. engines would revive the project. Cooling problems with a previous engine, which held up development of the plane until 1946 feeder interest cooled, vanished with the installation of the C-7. Pilots liked the 14-passenger transport. But no orders developed. Present indications are that the project now is shelved for keeps. What Lockheed will do with two experimental units, completed and flown, is uncertain, although their sale is possible if licensing costs do not exceed what can be expected of a buyer wanting them for personal transports or commercial carriers. The plane's designed specifications called for a top speed exceeding 250 mph., 1,500 ft. takeoff, 1,325 fpm. climb at 16,000 lbs. gross weight, and maximum range of close to 2,000 mi.**

► De Havilland of Canada has begun assembly of British manufactured de Havilland Vampires at Toronto. Aircraft are built and test flown in England, knocked down and shipped in four crates per plane to Canada where they are re-assembled and test flown again. RCAF has ordered 85 Vampires with deliveries scheduled at three a week. The Canadian branch of de Havilland is also manufacturing its Beaver, bush freighter, overhauling Canso and PBY-5A flying boats for private firms and shipping war surplus Mosquito bombers to China.

► **Thompson Products 1949 calendar reveals that the first jet plane to fly was the German Heinkel HE-178 on Aug. 27, 1939—exactly one year before the highly publicized flight of the Italian Caproni-Campini. The Italian flight was previously generally accepted as the first successful jet flight. The Heinkel 178 preceded the British Gloster E-28/39 by 21 months.**

► **Circular proposals for a new two-seat helicopter containing special provisions for ground cooperation duties have been issued by the Air Force for eventual procurement for the Army Ground Forces. Craft would have less than 200 hp. to meet current arbitrary dividing line between AGF and AAF aircraft.**

► Piasecki Helicopter Corp., in addition to an increase in its Navy HRP contract to 40, is readying a new, smaller Navy helicopter for use aboard carriers. An Air Force contract for a large tandem helicopter design study is now nearing completion.

► **Westland Aircraft will use Alvis Leonides 500 hp. air-cooled engines in the production version of the Westland-Sikorsky S-51 helicopter, built under United Aircraft license. Original agreement specified Pratt & Whitney Wasp Junior engines.**

► Air Force expects to receive 900 airplanes with an airframe weight of 12,000,000 lb. during the current fiscal year with the Navy receiving 1000 planes with a 15,000,000 lb. airframe weight. Budget requests for fiscal 1949 would provide 1164 planes for the Air Force with an airframe weight of 8,100,000 lb. and the Navy with 967 planes having an airframe weight of 7,100,000 lb.

LETTERS

UPMA Answers Balfour

To the Editor:

I read with interest the excellent letter of Capt. Maxwell Balfour, director of Spartan School of Aeronautics, regarding UP&MA's proposal to maintain a file on each CAA inspector and the quality of his service to the public. There is a lot of truth in what he says, but I feel that Capt. Balfour has missed the point entirely.

No one can deny that the majority of CAA inspectors are doing a good job. They are kind, painstaking and considerate of everyone with whom they deal. Their work reflects credit on the CAA and the industry. It is not my desire to say or do anything which would make their work appear in an unfavorable light. They are to be highly commended for the fine work they are doing.

The real point at issue, and the idea behind the plan to set up a master file on CAA personnel, is to determine which ones are not doing a good job. The plan will not be limited to field inspectors. It will also include staff personnel, regardless of position or rank, whose motives or actions are subject to inquiry. Unfortunately, a number of CAA personnel of high rank do not evidence the same spirit of public service that most of the field personnel demonstrate.

It is our purpose to focus attention on the records of undesirables to the end that they can be eliminated from CAA service as being incompetent or unfit, or that their actions may become responsive to the public needs.

I have carefully examined the list of 55 inspectors contained in your letter. Many of them I know personally, and as far as my personal dealings with them are concerned, their records are good. However, others do not share my views concerning six on the list. I am in no position to judge these men until the record has been assembled—not from the experiences of one or two individuals—but from many who have dealt with them. How else can you judge whether a person's record is good or bad?

Capt. Balfour refers to the proposal as a "blacklist" and states that no effort is made to get the inspectors' side of the story. He has apparently overlooked the fact that each report involves a grievance, wherein some person claims to have been treated unjustly. These cases are investigated and the inspector is asked to justify his actions. In many cases which have been handled through UP&MA the actions complained of have been justified. In many others mutual misunderstandings between the inspector and the complainant have been straightened out. In other cases the inspector has been wrong and orders have gone out from higher authority to correct the errors. If Capt. Balfour can suggest a method which is fairer and more effective UP&MA is interested in learning about it.

While we are on the subject of blacklists, I wonder if Capt. Balfour ever heard of the district and regional inspectors meetings wherein individual operators and others are singled out and labeled as "no-good," "trouble-makers," "chiselers," "incompetents," etc.? What opportunity does a person have to answer such charges? The accusation may be based on personal differences between the inspector and the person mentioned, but regardless of the truth, that person is blacklisted in the minds of inspectors present. It makes no difference that the inspector making the charge may be subsequently transferred. The damage has been done and the accused is placed at a disadvantage in dealing with the inspector who follows.

Capt. Balfour states that UP&MA is not a competent agency to consider the evidence and render judgment. It does not propose to do that. Its purpose is to "assemble the evidence" and make it available to CAA or Civil Service if, and when, the actions of any CAA personnel become the object of investigation.

There is one other point—Capt. Balfour speaks of being unable to recall a single instance of mistreatment. I know he speaks the truth; but he is the director of one of the largest business institutions in aviation. A very able attorney represents that institution. Capt. Balfour is able to fight back successfully but what about the small operator who has no attorney or influential friends to help him? These things make a difference. UP&MA could do little to help Capt. Balfour but it has done much for those who could not help themselves. This proposal is one of the many ways UP&MA believes it can continue to help those who are unable to help themselves.

James W. Batchelor, General Counsel
United Pilots & Mechanics Association
Washington, D. C.

Forgotten Men

To the Editor:

I was sure I had forgotten the names (listed on the editorial page Jan. 5) of some of the good men with whom we have come in contact in our relationship with the inspection division of CAA. It was most unfortunate that I omitted the names of two who have done a lot of work with us and I would be very grateful to you to see that they are mentioned in an early issue with my apology for the oversight.

These men are Charles J. Kavanaugh, Tulsa; and J. B. Jaynes, Fort Worth.

Maxwell W. Balfour, Vice President
Spartan School of Aeronautics
Tulsa, Okla.

From Policemen to Guides?

To the Editor:

During my 23 years in the industry I have watched the federal aviation governing bureau progress from the aviation "police force" of the past to its present status of a helpful guidance agency. . . .

I therefore take exception with Jim Batchelor's (UPMA) inference that CAA inspectors as a whole are bad, while at the same time agreeing with him that putting the finger on the few undesirable public servants would not only be helpful to the industry but also to CAA.

I take issue with Capt. Balfour's question of the right of any aviation organization to investigate complaints concerning abuse of powers vested in public employees. In fairness to the great majority of conscientious inspectors, the bad ones should be weeded out, and I believe this can be done only by bringing their activities to light.

During the year I have spent in Texas I have, of course, heard both praise and criticism of CAA. But in all my career I have not found a case where an entire CAA district has been wholeheartedly for every member of the district inspection staff, with exception of the four inspectors headquartered at San Antonio.

I therefore nominate for your gold star list: Wortley Rudd, Frank Hand, Sam Burns, and Charlie Pechanic. In my estimation, they represent what the CAA inspectors should be.

Don V. Seevers, General Manager
Texas State Aviation Assn.
San Antonio, Tex.

Norwood Men Praised

To the Editor:

I read with interest your editorial Jan. 5, concerning the capability of Civil Aeronautics Administration inspectors. I would like to commend the inspectors of the Norwood, Mass., regional office—namely: Royce G. Kunze, William F. Placek, and Frederick W. Falconer. . . .

In regard to the "blacklist" as proposed by UPMA, I see no need for independent organizations maintaining such a list, when it is common knowledge that an operator or an individual who does not receive satisfaction from his local CAA office can register his complaint with the Administrator in Washington.

In most instances, these inspectors are under-paid, under-staffed, and overworked, and, in my estimation, despite these handicaps, are performing their duties in a highly satisfactory manner.

Henry A. Laughlin, Jr., Vice President
North Atlantic Airways, Inc.
Beverly, Mass.

Praise for Inspectors

To the Editor:

Your article Jan. 5 entitled "Praising the CAA Inspector" has come to our attention and we should like to express concurrence with the opinion of Capt. Balfour to the effect that our experience with CAA inspectors has been eminently satisfactory. . . .

To the names of those listed by Capt. Balfour who merit commendation for their fairness, cooperation and devotion to duty, we should like to add the names of CAA inspectors at our facility who should be praised for like qualities:

Rex Anger	C. W. Von Rosenberg
R. V. Ford	R. D. Spencer
John P. Jones	J. W. Simpson

H. L. Howard, Exec. Vice Pres. & Treas.
Texas Engineering and Manufacturing Co.,
Dallas, Tex.

West Coast Predicts Gain In Military Ram Jet Knowledge

Although extent of disclosures is still uncertain, speculation on advancements made by services continues to grow.

By SCHOLER BANGS

This will be a "ram jet" year on the West Coast, and experiments scheduled at military bases should produce a full evaluation of the theoretical potentialities of the "flying stovepipe" in its sub-, trans-, and supersonic configurations.

The extent to which Army and Navy branches of the air arm will permit disclosure of results still is uncertain.

However, Army (more so than Navy) has dropped previous reticence to the extent of announcing existence of a 30-in. ram jet, designed and built by Marquardt Aircraft Co., Venice, Calif., and soon to undergo flight tests.

While possessing a design speed rating of Mach. 1.0, this particular powerplant falls at present in the sub-sonic category.

▶ **Rumors Not Supported**—Rumor of the existence, and ground testing on the West Coast, of a comparatively massive ram jet having a diameter of 4 ft. has not yet been supported by either Army or Navy announcements.

With one exception, present tests in California appear to be aimed at development of a variety of ram jet sizes for the powering of guided missiles at ranges up to several hundred miles.

The exception is Marquardt Aircraft's experiments with jet thrust helicopter rotors, which now appear to be on the shelf temporarily pending the company's interim testing of a rotor system to be powered by small pulse jet engines to be mounted at the blade tips of a helicopter nearing flight test.

At Navy's Air Missile Test Center at Pt. Mugu, near Los Angeles, ram jet engines somewhat smaller than the Army's 30-in. unit have been under flight test in powering Gorgon missiles produced by Martin Aircraft, and it is believed that results may show marked gains over missiles powered by pulse jet engines. While pulse jet missiles have been launched from both the ground and the air, the ram jet vehicles so far have been wholly air launched, possibly in deference to the relatively high speed indicated for their successful firing and initial output of power. The latter is an important factor in that sub-sonic ram jet efficiency still is extremely low, approximately 8 percent at Mach. 1.0.

▶ **Power Estimated**—With this efficiency in mind, a fair concept of the ram jet engine's power output at supersonic speeds may be gained from Army's description of the 30-in. engine.

The Army says that at its design speed (Mach. 1.0) the 30-in. engine develops greater thrust than the largest available American turbojet, and that it is sufficient to power a "large pilotless aircraft or a small fighter."

Estimating from photographs of the engine that it weighs in the neighborhood of 400-500 lb., and with Army's admission that power output is in excess of 10 lb. of thrust per pound of weight at design condition, it may be assumed that the 30-in. engine offers close to 5000 lb. thrust at Mach. 1.0.

Should a supersonic configuration of this size be developed to reach a speed at which efficiency would be 25 percent, the power output would be, in term of thrust, 15,625 lb., or (if the engine weighs 450 lb.) 34.7 lb. thrust per pound of engine weight.

▶ **Figures Speculative**—Obviously, such figures must be treated as speculative in that no supersonic data pertaining to actual or anticipated ram jet efficiencies at high speed have been released for publication.

This much, however, the Army does say, pertaining to the 30-in. engine performance:

It develops a thrust approximately proportional to the air density and to the square of the flight speed;

Specific fuel consumption per pound of thrust is about four times that of a turbojet engine, but only one-fifth the specific fuel consumption of a rocket engine; and the engine burns fuel at a rate approximately proportional to the flight speed and air density.

Army's success in the testing of two 20-in. ram jets mounted on a Lockheed P-80 based at Metropolitan Airport, Van Nuys, Calif., may result in this plane's being used as the flying test stand for the new 30-in. engine.

Indicative of Army and Navy ram jet research throughout the nation, at several development centers, is the announcement that the 30-in. engine culminates nearly three years of work on this and smaller units. This specific project was headed by Karl Schakel, project engineer, and supervised by Don Walter, assistant chief engineer, and Roy E. Marquardt, chief engineer, of Marquardt Aircraft Co., with assistance from R. T. DeVault and Herbert Saffel, respectively supervisor of Navy research and chief test engineer of University of Southern California's ram jet laboratory.

Du Pont Board Names Greenewalt President

The board of directors of E. I. du Pont de Nemours & Co., at the regular monthly meeting (January), named Crawford H. Greenewalt the tenth president that the company has had, and elected Walter S. Carpenter, Jr., chairman of the Board.

Carpenter's resignation as president, and his designation as chairman of the Board, followed retirement of Lammot du Pont from the latter post.

In addition to assuming the presidency of the company, Greenewalt became chairman of the Executive Committee, of which he had previously been vice chairman, and a member of the Finance Committee.

Du Pont will continue as a member of the Board, while Carpenter retains his membership on the Finance Committee.

It was also announced that Walter J. Beadle, a vice president and member of the Board, had reisgned as treasurer of the company and had been elected to membership on the Executive Committee. T. C. Davis, who was formerly first assistant treasurer, was elected treasurer to replace Beadle.

Greenewalt joined the organization in 1922 as a chemist in the Philadelphia Works. He was made a director in 1942, and in the same year became chemical director of the Grasselli Chemicals Dept. He also worked on the atomic energy program carried out by du Pont for the government. He was elected a vice president and member of the Executive Committee in 1946.

In other personnel actions:

• **Air Associates, Inc.,** elected Rudolph F. Gagg president to succeed Kenneth J. McGrath. Gagg has been associated with Wright Aeronautical Corp. since 1930, and for the last seven years has been assistant to the general manager. Prior to his association with Wright, he was assistant chief engineer of Climax Engineering Co., Clinton, Iowa.

• **Jack & Heintz Precision Industries, Inc.,** elected Robert Heller, director and a member of the Executive Committee. Heller began his business career in Boston in 1921. As a director of Jack & Heintz, he will serve on a three man committee with Byron C. Foy, president of Jack & Heintz,

and Joseph E. Rogers, a former president of Addressograph-Multigraph Corp.

• **Consolidated Vultee Aircraft Corp.** appointed Frank W. Fink, chief engineer to replace Bernard W. Sheahan who is on a "long overdue vacation." Fink came to Convair from Buffalo 13 years ago, started as a design engineer in the powerplant division and advanced to several other positions at the plant, being chief of engineering for airline and military planes before his latest advancement. Dr. Albert E. Lombard, Jr., has been appointed engineering consultant. He will direct military aircraft sales under the supervision of Vice President-Sales W. A. Blees. Lombard will coordinate and supervise Convair engineering departments, and will also direct the operation of the Washington and Dayton offices. Dr. Lombard joined the company in December, 1944. His aviation career began with Curtiss-Wright Aircraft Corp. in 1929.

Further Summaries Given Of IAS Session Papers

Additional summaries of engineering analyses presented at the 16th annual meeting of the Institute of Aeronautical Sciences held recently in N. Y. appear below. This is the second and final installment of the summaries; others appeared in the Feb. 2 issue.

"Inert Gas Installation," by **H. W. Naulty, Cornell Aeronautical Lab.,** was concerned with new system for reducing aircraft fire hazards by blanketing vacant space, inside and around fuel tanks, with low oxygen-content gases from the engine exhaust. Already installed in two Navy planes, procedure involves cooling of inactive exhaust gases by heat exchanger which quickly reduces temperatures exceeding 1,400 deg., to 70 deg. F. These gases are then led through a small "bleed" line into the gas tank.

"Critical Study of Aircraft Landing Gears," by **J. F. McBrearty, division engineer, Lockheed Aircraft Corp.,** stated that failure in drag direction was found to be predominant in service; that fundamental cause of service failures is deduced as dynamic overloading of landing gears resulting from critical rates of application of friction forces incident to spinning up the wheels to ground speed in landing, these critical rates having random probability of occurrence on any craft unless there is adequate damping. Possible solutions were discussed and hydraulic damping of horizontal wheel motion was advocated. It is believed that hydraulic drag damper will prevent much of landing gear and associated trouble heretofore experienced on many types.

Also offered at this session was **"Dynamic Lateral Stability as Influenced by Mass Distribution,"** by **L. Sternfield** and **M. O. McKinney, Jr., Stability Research Div., Langley Memorial Aero. Lab., NACA.**

Read at the Upper Atmosphere Aerodynamics Session was **"Heat Transfer to Bodies Moving at High Speed Through the Upper Atmosphere,"** by **J. R. Stalder** and **D. Jukoff, Ames Aeronautical Lab., NACA.** Explained was how using methods of kinetic theory, calculations have been made of the temperature of bodies traveling at high speed in the upper atmosphere, covering altitudes of from 75 to 150 mi. and speeds up to 13,000 mph. It was shown that under all flight conditions above 75 mi., to alleviate the frictional heating problem, body angles should be kept as small as possible, implying slender bodies with long pointed nose sections. It was shown that for negative body angles with respect to the flight path; i.e., on the boat-tailed section of the body, the skin temperatures are very much lower than on nose section, and above a certain speed, the faster the missile is flown, the cooler the boat-tailed section becomes, suggesting the use of an internal cooling system connecting forward and rear portions of the body. At altitudes of 150 mi., it was stated that solar radiation is the predominating factor determining the body temperature, at all flight speeds.

Also read at this session were **"Wind-Tunnel Testing Problems in Superaerodynamics,"** by **H. S. Tsien, associate professor, Aeronautical Engineering, MIT.;** and **"Upper Atmosphere Temperature from Helgoland Explosion,"** by **E. F. Cox, Naval Ordnance Lab.**

Offered at the Aerodynamics Session was **"Supersonic Characteristics of Triangular Wings,"** by **L. Beskin, Design Research Div., Bureau of Aeronautics,** which investigated a connex problem dealing with wings consisting of two triangles reunited by their bases. Apex of each triangle is the wing tip, the base is the root of the half wing, and the two other sides are the leading and the trailing edges, the sweeps of which are assumed smaller than the slopes of the Mach. lines. Both upper and lower surfaces are conical or prismatical, so that the wing has the general shape of a flat cone or pyramid with sharp leading and trailing edges. From the data obtained it is possible to compare triangular airfoils of various shapes between themselves or with other types of airfoil planforms.

"Linearized Theory of Supersonic Control Surfaces," by **P. A. Lagerstrom, assistant professor, Guggenheim Aeronautical Lab., Caltech,** investigated the mathematical aspect of the problem of control at supersonic speeds. It was explained that by making suitable simplifying assumptions, one may solve the equations to which the problem leads, and that general methods have been developed and applied to a large variety of control surfaces, both of more conventional shapes and of the triangular type.

"Stability and Control of Supersonic Aircraft," by **A. F. Donovan, A. H. Flax, H. A. Cheilek, Cornell Aeronautical Lab.,** explained how information on the supersonic aerodynamics of wings, bodies, tails, and jets has been incorporated into a theory for supersonic aircraft analogous to that now used for the prediction of stability and control of subsonic airplanes. Wing downwash, sidewash, and wing body interference effects hitherto generally ignored in studies of supersonic control problems were included in the analysis. Offered was the thought that there are no serious obstacles to obtaining satisfactory control and stability characteristics at least in the speed range from one-and-a-half to four times sonic speed.

In **"A Wing Body Problem in a Supersonic Conical Flow,"** by **S. H. Browne, L. Friedman** and **I. Hodes, Aerophysics Laboratory, North American Aviation, Inc.,** it was stated that no predictions based on fundamental principles had as yet been given concerning the effect of putting wings on high-speed projectiles. Making such a prediction, this paper, by considering the idealized system of a cone fitted with triangular wings, is intended to help the engineer to make an estimate of the magnitude of interaction forces acting on his real system. Forces acting on this wing-body combination were computed with the aid of potential functions especially adapted to the solution of supersonic problems.

"Prediction of Load Distribution and Its Effect on Aerodynamic Characteristics at Subsonic Speeds for Wings of Arbitrary Plan Form," by **V. I. Stevens, Jr., aeronautical engineer, NACA,** examined the Falkner, Mutterperl, and Weissinger methods for estimating span loading to establish their relative accuracy and ease of application. The experimentally determined loading and associated aerodynamic characteristics of a number of swept wings were used as a basis for judging the accuracy of the methods. It was concluded that the Weissinger method gives good accuracy and involves by far the least computing effort, and that the Falkner method gives the best accuracy but at considerable expense in computing effort. Since the Weissinger method appeared most efficient for use where the large number of wings were to be investigated, it was used to predict the aerodynamic characteristics of a wide range of wing planforms.

Completing the Aerodynamics Session were **"The Boundary Layer of Yawed Infinite Wings,"** by **J. M. Wild, Graduate School of Aeronautical Engineering, Cornell University;** and **"The Transient Reaction of a Two-Dimensional Wing at Supersonic Speed Due to Change in Angle of Attack,"** by **Chieh-Chien Chang, associate professor, Department of Aeronautics, The Johns Hopkins University.**

More Jobs Available For Aero Engineers

Nine leading aircraft manufacturing companies expressed the opinion that they will be in the market for aeronautical engineers graduating from colleges in 1948, according to results of a recent poll by the undergraduate publication at Rensselaer Polytechnic Institute, Troy, N. Y.

In answer to the question "Will positions in your company be available for aeronautical engineers graduating in 1948?" Bell, Boeing, Chance Vought, Goodyear, Grumman, Lockheed, Martin, Northrop and Republic answered "yes." Negative answers were received from Kellett, Kollsman, Piper and Texas Engineering. Average salary quoted by affirmative answering companies was $225 per month, ranging from quotations of $152 to $300 per month. Range of possible job openings varied from one or two to 50 for Chance Vought and 125 for Martin.

Company personnel directors responding to the survey cited in detail the fields which were open. All companies stated that men will be required principally for work in aerodynamics, structures and stress analysis, design and drafting. Also listed were opportunities in flight testing, weights, powerplants, controls and liaison. Some companies expressed extreme need for men thoroughly prepared in structural engineering, vibration and flutter, and thermodynamics.

Cee Bee Announces Executive Appointments

Expansion of Cee Bee Chemical Co., Los Angeles, to create a national market for its aviation cleaning solvents has been indicated.

E. E. Finch, co-organizer and former vice-president of Aviation Maintenance Corp., Van Nuys, Calif., has joined as maintenance engineer.

Stephen Andrews, former Lockheed process research engineer, has been appointed process engineer.

Each possessing a background of extensive aviation experience, Tom Merrick and O. K. Gregson have been appointed, respectively, managers of East Coast and Southern States Cee Bee divisions. Merrick at one time was production manager for Bell Aircraft. Gregson formerly held key maintenance posts with Canadian Air Lines, Canadian Fairchild, and Aviation Maintenance Corp.

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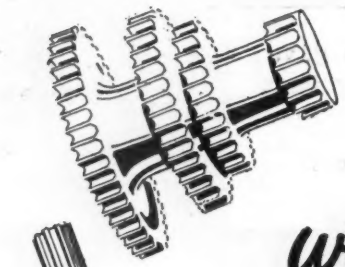

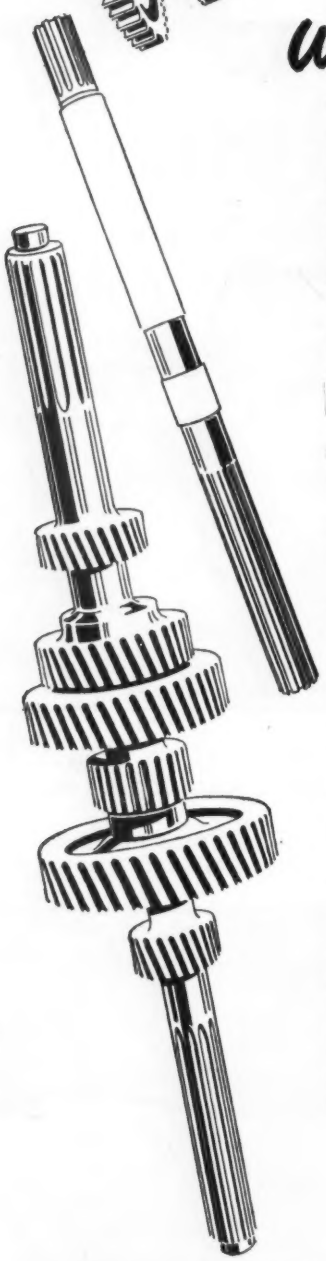

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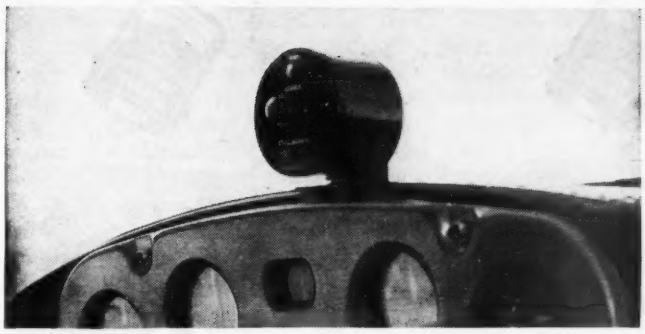
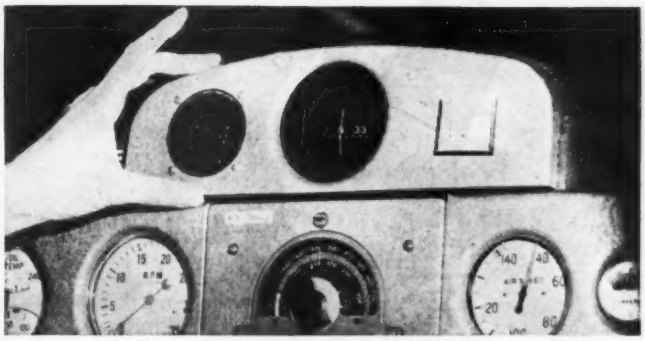




Typical installations of stall warning indicators. At left is bracket-mounted Arnold device; at right is Safe Flight's panel-mounted unit.

Stall-Warning Indicators Refined

Two Devices now on market feature aerodynamic means of sensing stall, and claim reliability under all flight conditions.

BY ALBERT E. SMYSER, Jr.

Compulsory installation of stall warning devices on all private planes has been recommended by the Committee of Aviation Psychology of the National Research Council, after receiving a report on stall recognition studies conducted by the Educational Research Corp. at Bedford Field, Bedford, Mass.; Cumberland Airport, Nashville, Tenn.; and the Westchester County Airport, New York.

Basically, the stall warning indicator is not a new instrument—it has been known, in various forms, for years.

An early form consisted of a piece of string mounted in the slipstream at the trailing edge of the wing, so that in normal level flight it streamed out horizontally, but when the craft approached a stall, the string would droop and jerk erratically. Obviously this was too rough an indication for precision gaging, but at the time it was considered a great help to the pilot. Further developments in this field brought many varied inventions.

One of the more recent indicators, operating on the principle that attitude of plane was chief source of stalls, employed a mercury switch which initiated the warning when the nose of the plane was raised beyond the maximum climb angle (from level flight). Disadvantages of this type device were immediately apparent—the warning went off in turbulent air, and failed to go off in steep turns; and it operated continuously on the ground and during normal landings.

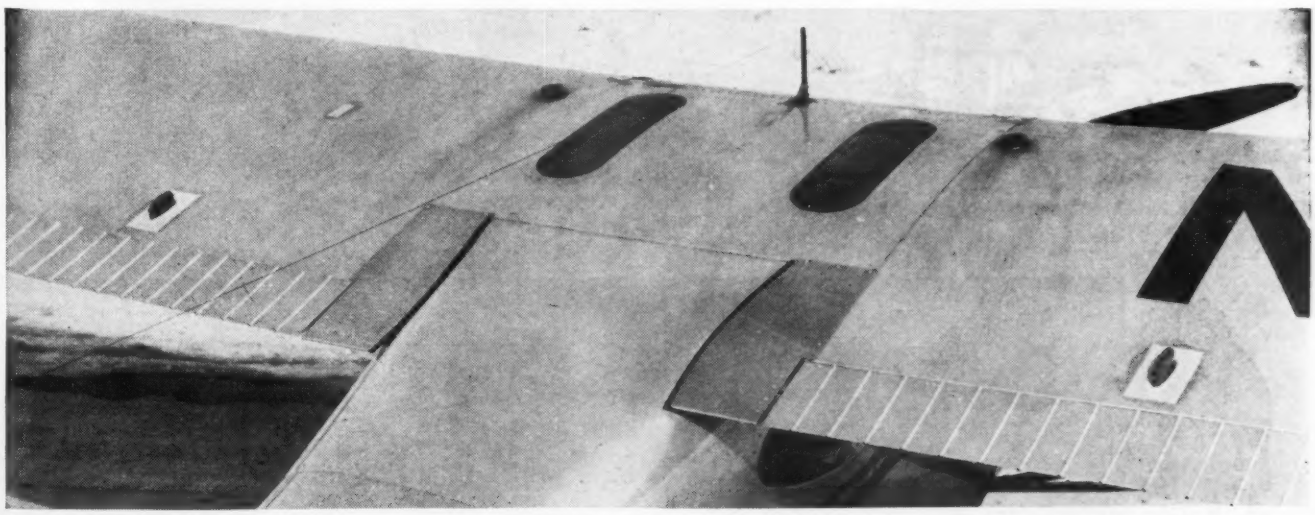
Latest devices have taken cognizance of the fact that not only attitude, but airspeed and lift are determining factors of the stalling speed of a plane.

At the present time there are two warning indicators on the market, which have been proved, through use, to be adequately reliable for use on personal aircraft. These are the Arnold Airplane Stall Warning Indicator, manufactured by Gordonay Products Co.; and the Safe Flight Stall Warning Indicator, made by Safe Flight Instrument Corp.

The Arnold device is best described as a velocity sensing instrument, the "brain" of which is the detector. This, by virtue of its location on the wing, detects the breakdown of airflow which occurs over the wing prior to stall.

When there is normal laminar airflow across wing, the boundary layer at the wing surface is very thin and the detector is exposed to high velocity airflow. As the angle of attack increases to the point where the airflow can no longer follow the airfoil contour, the boundary layer begins to thicken and the airstream starts to break away from the wing surface.

As turbulence sets in at the trailing edge of the wing the detector is enveloped by a region of slow moving, turbulent air which, because of eddies,



Arnold's stall sensing units are located on wing upper surface near trailing edge in area of turbulence which heralds stalled condition.

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may even be flowing forward at the wing surface. The detector is actuated by the sudden drop from high speed laminar airflow to the relatively low speed turbulent flow. This condition of breakdown in airflow always occurs along the trailing edge of the wing first, but not along the entire length of the trailing edge simultaneously. Instead, it begins at some point and spreads out over the wing progressively as the angle of attack increases. By locating detector units in this region of initial stall it is said to be possible to initiate a warning well in advance of complete stall.

Various conditions change the location of the point of initial stall, as well as the pattern of stall progression. This change can be caused by lowering the wing flaps, landing gear, or by formation of ice on the leading edge. Hence, it is often necessary to place two or more detectors on a wing, located close to the regions of initial stall for the various conditions.

The stall warning will function independently of the indicated air speed and signal a warning of incipient stall, regardless of whether the stall condition is brought on by low speed or maneuver, even though the indicated stalling speed may have been changed due to lowering the landing gear, raising or lowering the flaps, formation of ice, or change in gross weight.

The detector unit is permanently fastened to the wing with rivets or a fabric patch. The detector head is readily removed from the base for inspection and adjustment, by loosening only two small lockscrews.

The design has the feature that the electrical switching mechanism is totally enclosed, and the entire unit is on the exterior of the wing where fuel vapors cannot accumulate as they might inside the wing when wing tanks are used. Due to its smooth outline and location on the wing, it is not subject to damage by fuel hoses and wing covers.

Dual warning reliability provided by the two wing detectors is duplicated by the cockpit indicator which gives both visual and audible warning. This indicator is provided with lugs for panel mounting, or a bracket for mounting on the cowl above the instrument panel. It is provided with a test switch to check the proper functioning of the device while in flight, and also has a switch which can be used to silence the buzzer (without affecting the signal light) while taxying.

Installation weight of the Arnold device is said to be 16 oz. for metal or plywood wing mounting (using a single detector) and panel type indicator. Additional detectors weigh 2 oz. each for metal wings and 2¼ oz. for flanged-base models used on fabric covered wings.

The Safe Flight stall-warning indicator was developed by the Civil Aeronautics Administration, using a method proposed by Dr. Leonard M. Greene, an outstanding aerodynamics authority. This indicator is currently being installed as standard equipment on Stinson Voyagers. Unlike previous stall warning indicators, which have relied primarily on variations in airspeed, the Safe Flight operates on a new principle which gives accurate warning of impending stall, regardless of attitude or the type of maneuver being performed.

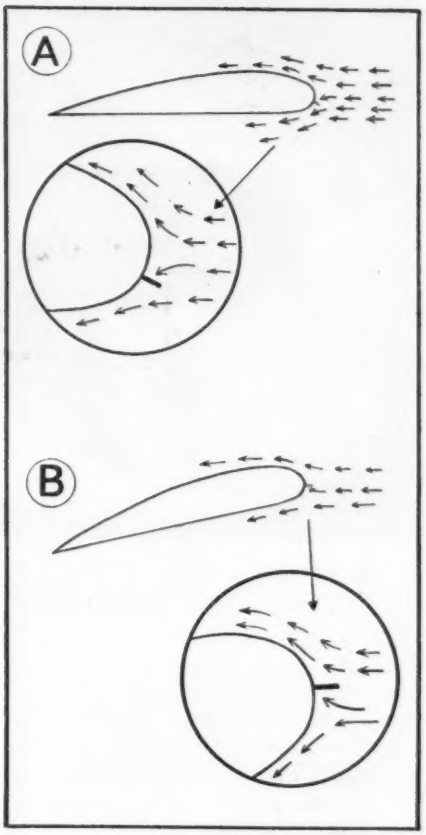


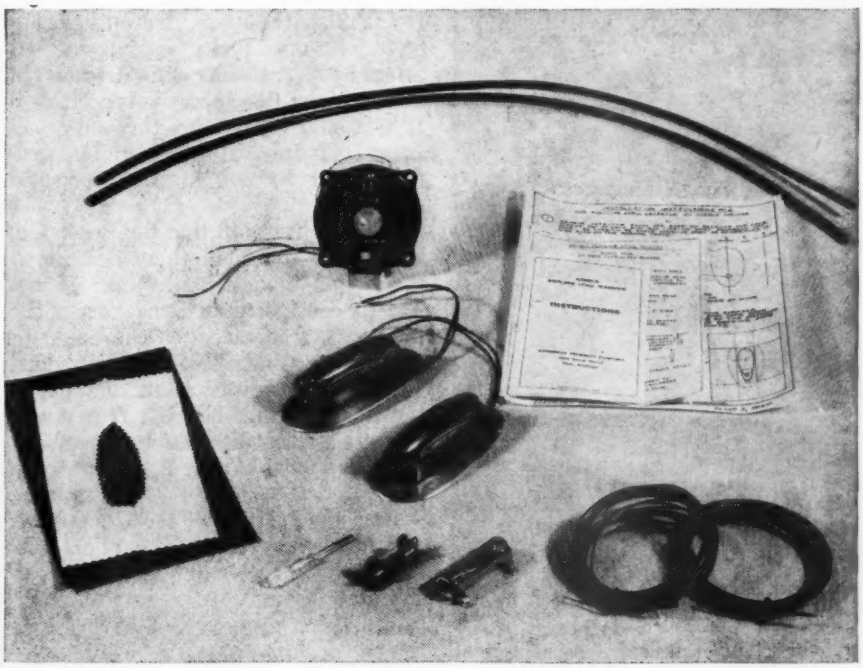
Diagram shows (A) position of Safe Flight stall unit's sensing vane in normal flight airflow, and (B) change in vane position brought on by change in airflow upon approach of stall condition.

Operation is based on the aerodynamic fact that a wing cuts the air so that one portion passes above the wing and the other passes below. This point of division in normal flight is just below the extreme forward part of the leading edge. The vane of the indicator is located in such a way that, in normal flight, the air flow keeps the electric circuit open.

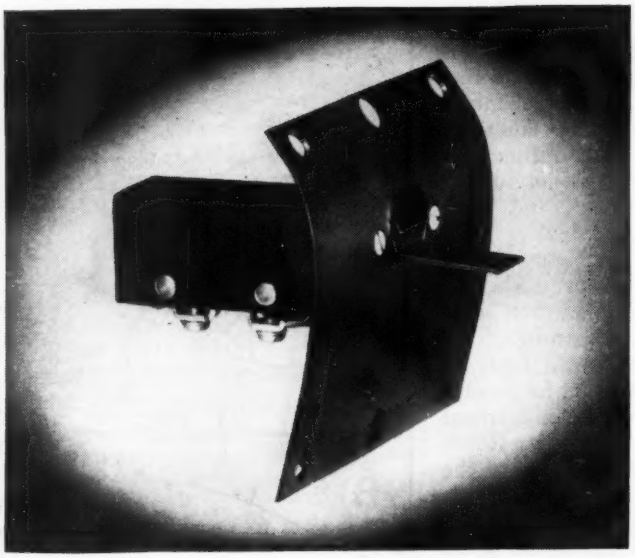
As the wing approaches the stall, the division point on the leading edge moves downward below the vane, causing the vane to flip up. This closes the electric circuit actuating the light and horn in the cabin.

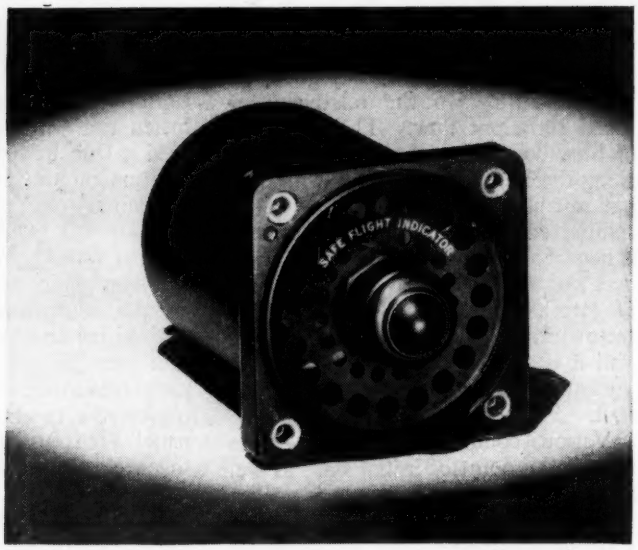
Basic elements of the device are a wing unit and the cockpit indicator. The wing unit, which houses the actuating mechanism, also contains a relay which closes the electrical circuit. Unit is built into a seamless Bakelite box from which protrudes a small tab or vane. The vane, made of heat-treated 75 ST to withstand rough abuse, extends forward approximately one inch from the leading edge and is one inch wide.

Except for the vane, the actuating mechanism is contained within the wing and requires only a 1¾ by 1⅜-in. hole in leading edge for installation.



Installation kit comprising all parts and instructions for the Arnold stall warning system.





At left is stall-sensing-vane and microswitch of Safe Flight's wing nose installation. This unit initiates signal for cockpit indication. Indicator (right) is combination device which includes red warning light at center surrounded by a series of audible-signal holes.

When circuit is open, vane is held down by the slipstream and spring tension. Only when the airplane is in a critical condition prior to, and during the stall is the vane raised to close the circuit. This feature eliminates the undesirable characteristic of having the horn blowing at all speeds below stalling speed—the spring returns vane to "down" position below stalling speed. Thus on takeoff or during landing, the warning operates only for a second or two as the plane passes through the critical speed range, automatically indicating that instrument is operative.

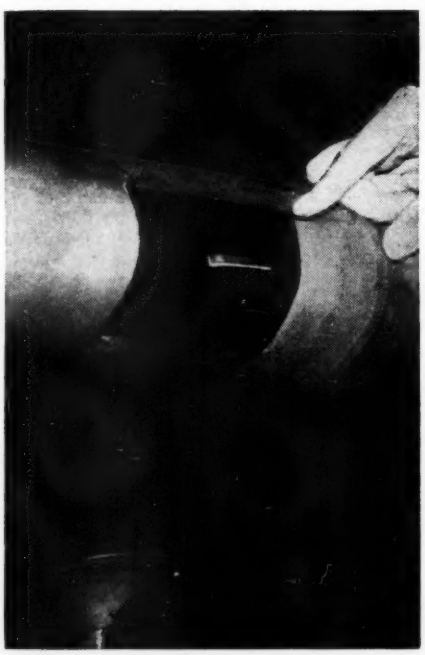
The instrument has been designed so that it cannot be shut off. A special model, however, for training planes may have a door-bell type switch installed which would permit the instrument to be cut out for as long as the switch was held down.

Wing unit is designed to operate satisfactorily under any kind of precipitation, but the present model is not designed to operate under icing conditions. Since private pilots rarely fly in icing conditions and almost universally abide by the common sense rule of landing or descending below icing level, the added expense of an electrically heated unit, while it could be easily installed, is not considered worthwhile.

Cockpit installation consists of a tamper-proof Bakelite case which can be mounted in a standard 2¼ in. hole. In the center of the instrument is the red light. The horn, which emits a fairly loud noise, is an integral part of the instrument.

Indicator is designed to operate on the 12-volt electrical system used in almost all modern personal aircraft. Should the installation be made on a plane having no electrical system, two 6-volt dry cell batteries wired in series will provide power for over six months operation. System is protected by a 10-amp. fuse.

Actual installation (considered by CAA as a minor modification requiring only appropriate log entries) may be made by any A & E mechanic. Templates provided with each unit permit accurate placement of the vane in relation to the leading edge. Span-wise, the unit is mounted about one-third of the way out on the wing—or at least far enough out to avoid the propeller slip stream. The vane protrudes downward at an angle of 30 deg. with the chord line.



Safe Flight stall sensing unit as it appears installed on wing leading edge.

Recommended setting calls for the indicator to operate at a speed 5 mph. higher than normal stalling speed. Adjustment is accomplished simply by sliding the wing unit up to increase the warning margin or down to decrease it. Once the instrument has been flight tested to operate at the proper margin in level flight, it will operate with the same percentage of warning in steep turns or unusual attitudes.

Installation weight of the Safe Flight Indicator is said to be 11 oz. (for all planes) and emphasis is placed on the fact that only one wing unit is required since the unit's sensitivity depends on direction of airflow rather than pressure.

A special installation designed for the Convair-Liner (240) is basically the same as the units used on light aircraft, with operation in icing conditions assured by anti-icing the detector in same manner that the wing is protected. It is claimed that the tiny unit will sense stalls in this large plane as accurately as it does on the small personal ships.

Safe Flight claims that the Beech Co. has agreed to install these devices on production models in the near future. This is considered an indication of the industry's acceptance of the value of stall warning indicators, and their added attraction to private pilots and operators. It is further believed that it will lead to similar installations on planes manufactured by other lightplane companies.

Recommendation of the Committee, and favorable reports from pilots who have flown planes equipped with warning units should go far towards pointing out the advantage of having such safety devices installed as required equipment in all types of aircraft.

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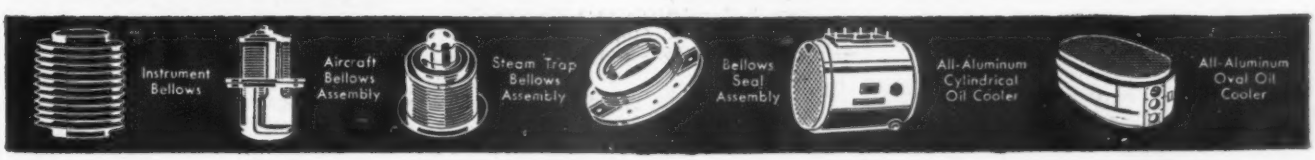


Aero Knowledge Now Integrated

Standard Aeronautical Index—new abstracting and cataloging project—collects, screens, and distributes technical data.

By LESLIE E. NEVILLE

(Director, Standard Aeronautical Index)

While piecing together the technological war preparations of the Germans, the key men in the Air Documents Division frequently encountered cases where the Nazi effort was impaired or delayed by a directive from Hitler that no scientist be told what work any other scientist was performing. It was then that they realized how important it was to exchange ideas among technologists working in the same or related fields even when their work was classified for security. Plans for a discreet, selective system for dissemination began to take shape, and many months before the official merger of the armed services, the Air Forces and Navy pooled their efforts in a new program to save thousands of engineering man-hours in aviation research and development.

This new plan is an outgrowth of the post-war index project of Wright Field's Air Documents Division which completed evaluation, cataloging and dissemination of abstracts of 1,500 tons of captured German documents last August, some 15 months ahead of schedule.

The 12 years of intensified technological effort by the Nazis, represented by these documents, if reproduced in this country today, would cost two to three billions of dollars.

The new concept of intelligence, embodying distribution of classified information in accord with Air Force and Navy security safeguards, required a truly functional breakdown of the entire subject of aviation. If the distribution was to be automatic and effective, an individual scientist or technological group should receive quick notification of everything pertinent to their specialty but nothing more. This would reduce to a minimum the circulation of classified information and at the same time save many hours of often fruitless searching through abstracts of irrelevant material.

Existing library classification systems were useless for this purpose so a new and functional type had to be devised. To create such a system required the best thinking top engineers, scientists, and educators in aviation.

Since the Air Documents Division lacked personnel and time for such an undertaking, a contract was awarded to the Institute of the Aeronautical Sciences (*Aviation News*, June 23, 1947) to develop the system called the Standard Aeronautical Index. The IAS was selected because of its neutral, nonprofit status and because its membership embraced the people whose talents were required for this project. In addition to the Air Documents Division; the Engineering Division, Air Materiel Command; the Bureau of Aeronautics; and the Office of Naval Research have contributed funds for the project.

First step was a questionnaire directed to all upper grades of members of the Institute and the roster of previous users of A.D.D. services. The questionnaire asked that each replier state his specialty in aviation work. Results were organized, screened and studied and, at a Finalization Conference late in October, the field was divided on the basis of these replies into 47 major Divisions. (AVIATION WEEK, Dec. 15, 1947).

In the meantime, contacts had been made with several hundred known leaders in various fields of specialization who offered enthusiastically to assist. Thus approximately 1,500 leading specialists had contributed to this first breakdown making it as truly functional as was possible.

Next step was a further breakdown of the major divisions into sections representing the way in which each division is subdivided in actual practice. This work is being carried on largely by personal contact with the specialists by members of the Standard Aeronautical Index staff working out of the home office in the IAS building in New York and branch offices at Wright Field and at Grand Central Airport, Glendale, Cal.

In the case of Guided Missiles (Division No. 1) the subject is divided into twelve sections, the first of which is "Guidance and Control"; the second, "Launching"; and the third, "Propulsion." An engineering group developing a launching track for a guided missile may receive only material on this section. Thus their research work is simplified and the policy of minimum distribution of classified information is served.

To simplify further the task of the researcher, an alphabetical list of detailed subject headings will be provided for each section of each division of the Index. This arrangement provides both a vertical and horizontal approach for the research worker.

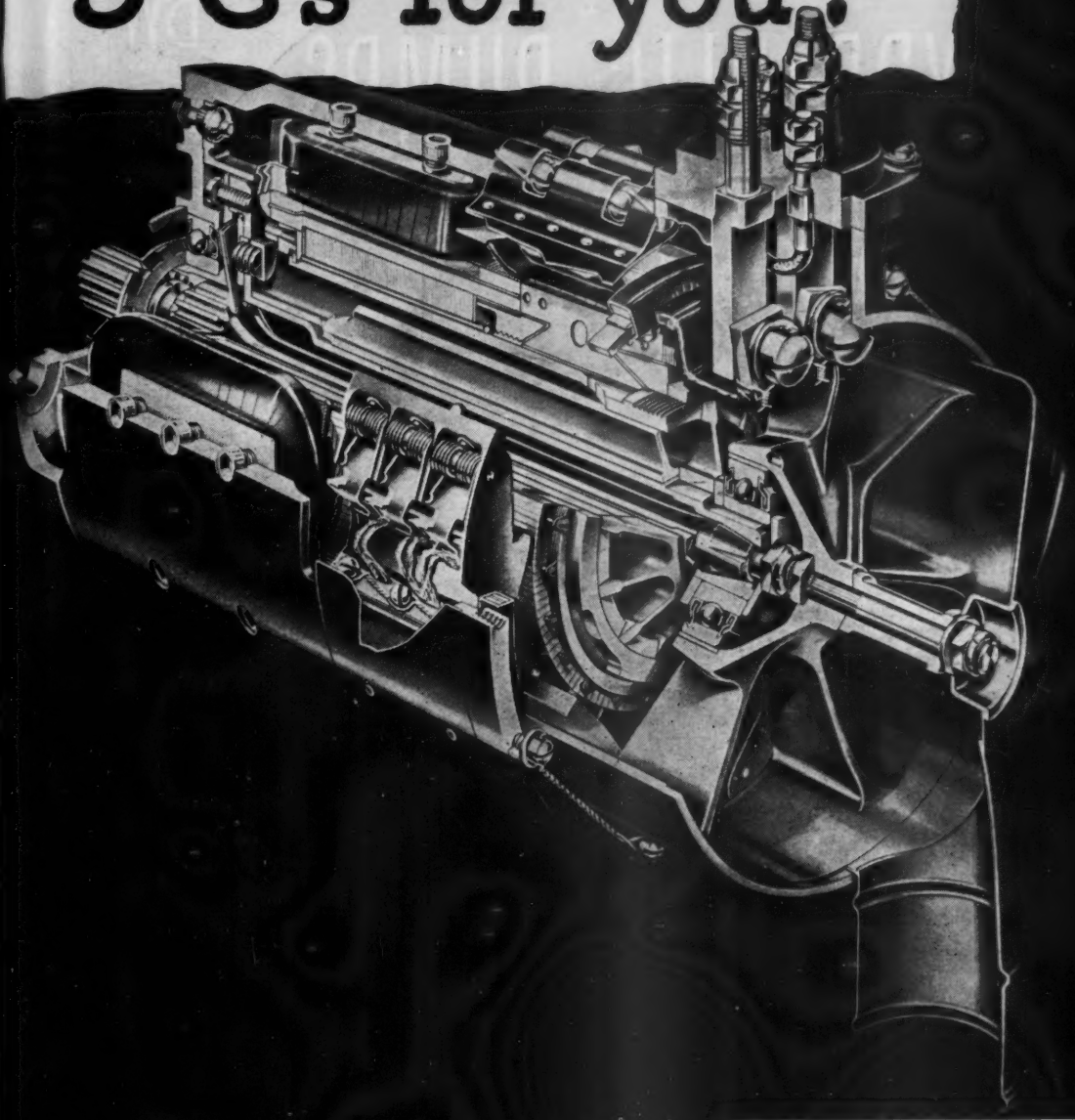
The Standard Aeronautical Index departs radically from conventional library practice in that it is neither an index (alphabetical list of subject headings) or a classification system (breakdown of

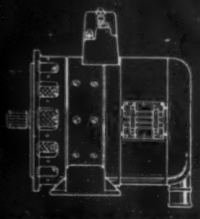
STANDARD AERONAUTICAL INDEX
ALPHABETICAL LIST OF DIVISION HEADINGS

Aerodynamics (2)
Air Power (43)
Airplane Design & Description (10)
Airports & Airways (39)
All-weather Flying (31)
Atomic Energy (48)
Aviation Medicine (19)
Comfortization (23)
Electronics (3)
Equipment, Airborne (14)
Equipment, Electrical (16)
Equipment, Hydraulic & Pneumatic (20)
Flight Testing (13)
Fuels & Lubricants (12)
Gliders & Gliding (35)
Guided Missiles (1)
Hydrodynamics (21)
Installations, Ground (27)
Installations, Shipborne (28)
Installations, Underground (32)
Instruments (9)
Laws & Regulations (44)
Lighter-than-Air (40)
Maintenance (25)
Management & Finance (45)
Materials (8)
Meteorology (30)
Navigation (29)
Operations, Commercial (41)
Operations, Military (24)
Ordnance & Armament (22)
Organizations & Societies (46)
Personal Flying (42)
Personnel (37)
Photography (26)
Power Plants, Jet & Turbine (5)
Power Plants, Reciprocating (6)
Power Plants, Rocket (4)
Production (36)
Propellers (11)
Reference Literature (47)
Rotating Wing Aircraft (34)
Safety & Rescue (15)
Sciences, General (33)
Standards & Specifications (38)
Stress Analysis & Structures (7)
Thermodynamics (18)
Wind Tunnels & Laboratories (17)

NOTE: Numbers denote position in numerical arrangement

5 Gs for you!





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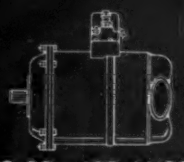

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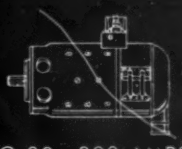

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G-26—200 AMPS.

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IP 792-A	2	1500	10001	$1\frac{1}{16}$—12	6.5 lbs.
IP 793-A	3	1500	10001	$1\frac{1}{16}$—12	6.7 lbs.
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field by subjects). It is really a combination of both systems of cataloging knowledge. The divisions and sections constitute a classification system but here again they depart from library practice which requires that classification systems evolve systematically from the theoretical to the practical and operational phases of a given field. Unlike older systems, the S.A.I. is a two-way vehicle. Its unique functional breakdown serves the needs of both dissemination and cataloging.

A further advantage in a rapidly changing field swamped by documentation is its extreme flexibility. Since there is no logical order in the arrangement of the classification breakdown, new divisions, sections and even subject headings may be added or subtracted without disturbing the simple numerical identification used. A recent example was the addition of an entire new division to the 47 finalized late last year. The new division is Atomic Energy—No. 48. Previously it was felt that this subject could be covered as a section under Sciences, General—Division No. 33. Increasing volume of documentation in nuclear physics and its future usefulness to the aviation industry prompted the decision.

Section headings for 13 urgently needed divisions have been finalized to date. The first six of these groups is contained in the accompanying section breakdowns for Index Divisions. Daily meetings at Wright Field are resulting in the creation of subject headings for all divisions and sections of the Index and these lists will be rounded out from other sources.

Because of the flexible nature of the Index it may also be used, while it is being created, in the A.D.D. dissemination program which is divided into two major parts on the basis of the security classification of the material involved. The distribution of security classified material comes under the Air Technical Index, that of unclassified abstracts under the Technical Data Digest.

The classified documents are screened, processed, abstracted, cataloged and microfilmed within 48 hours after receipt at Wright Field. Their microfilms are filed awaiting call and their abstracts are distributed on transparencies. Each of these ATI sheets contains six abstracts belonging in a single section of a division of the S.A.I. Recipients in small libraries or individuals with limited facilities may file them in ordinary ring binders. Larger libraries, contractors and educational institutions receiving them reproduce standard size catalog cards from the transparencies and file them under the indicated division and section numbers. When reading of the abstract indicates need for the entire document, its microfilm may be ordered by using simply the ATI number in the upper right hand corner of each abstract. Qualified recipients may retain the microfilms since this procedure saves the high cost to the government of having them returned to Wright Field.

To safeguard the patent and proprietary rights of contractors, a special category of "limited distribution" has been set up. Although military contractors' work is usually considered public property, it was recognized that there were cases where it would be harmful to the source to disseminate certain reports. A contractor may therefore request limited distribution for a specific report from his contracting agency. If this request is granted, the ATI abstract of the report will be confined to non-commercial or non-competitive recipients interested in this particular phase.

Abstracts of non-classified technical papers and articles appearing in magazines and other publications are furnished twice monthly in the A.D.D. publication the Technical Data Digest. To provide up-to-the-minute notification for recipients arrangements have been made with many publishers and professional societies to provide prepublication abstracts of articles before they appear. Thus the abstracts in the Technical Data Digest refer to articles appearing simultaneously with the Digest. These abstracts are printed on one side of the page for clipping and filing and are numbered and grouped according to the pertinent divisions of the S.A.I.

These two programs provide qualified recipients with a complete, fast notification of all current material pertaining to their specialized subdivisions of the field of aviation and greatly simplify the task of filing and finding what is needed. Together with the several other services they will save a conservatively estimated $72,000,000 annually in engineering time. This time saving may be priceless in the international technological warfare which is now going on.

The program was developed under the leadership of Colonel H. M. McCoy, Chief, Intelligence T-2 and Deputy Commanding General, Air Materiel Command; Lt. Colonel Albert A. Arnhym, former consulting industrial engineer and now Chief of the Air Documents Division; Ernest W. Robischon, formerly of the Cal Tech Faculty and now Technical Consultant, A.D.D.; and Captain N. A. Draim, Chief, Technical Data Division, Bureau of Aeronautics.

SECTION BREAKDOWNS FOR INDEX DIVISIONS

(1) Guided Missiles

1. Guidance and Control
2. Launching
3. Propulsion
4. Aerodynamics and Ballistics
5. Warheads and Fuzes
6. Ground Handling Equipment
7. Auxiliary Equipment
8. Structures
9. Instrumentation
10. Production
11. Performance
12. Description
13. Operation
14. Testing

(6) Power Plants, Reciprocating

1. Cooling
2. Induction and Supercharging
3. Combustion
4. Ignition
5. Exhaust System
6. Vibration
7. Fuel System
8. Lubrication
9. Accessories
10. Control
11. Components
12. Installation
13. Performance
14. Testing
15. Design and Description
16. Operation and Maintenance
17. Production

(8) Materials

1. Ceramics
2. Plastics
3. Rubber, Natural and Synthetic
4. Wood
5. Leather and Textiles
6. Adhesives and Sealants
7. Dopes, Paints and Finishes
8. Misc. Non-Metallic Materials
9. Iron and Alloys
10. Aluminum and Alloys
11. Magnesium and Alloys
12. Misc. Non-Ferrous Metals and Alloys
13. Powder Metallurgy
14. Sandwich Materials
15. General Data
16. Testing

(4) Power Plants, Rocket

1. Cooling
2. Control
3. Ignition
4. Exhaust Nozzles
5. Rocket Theory
6. Fuel System
7. Accessories
8. Combustion Chambers
9. Installation
10. Performance
11. Testing
12. Design and Description
13. Operation and Maintenance
14. Production

(5) Power Plants, Jet and Turbine

1. Cooling
2. Induction System
3. Compressors
4. Combustion
5. Ignition
6. Exhaust System and Nozzles
7. Vibration
8. Fuel System
9. Lubrication
10. Accessories
11. Control
12. Combustion Chambers
13. Turbines
14. Components
15. Installation
16. Performance
17. Testing
18. Design and Description
19. Operation and Maintenance
20. Production

(9) Instruments

1. Engine Instruments
2. Flight Instruments
3. Navigation Instruments
4. Position Indicating Devices
5. Timing Devices
6. Flight Test Instruments
7. Accessory Instruments
8. Instrument Testing and Calibration
9. Automatic Flight Control
10. Installation

Research Review:

Wing Spoiler Proves Its Worth In Searching Development Tests

Tunnel research supplemented by flight testing reveals potentialities of this control system device. Military applications are detailed and refinements outlined.

By ROBERT McLARREN

The increasing wing loading of aircraft (up to 100 lb. per sq. ft.), particularly high-performance military types, has placed a premium on satisfactory landing and takeoff characteristics which are most easily attained by the use of high-lift flaps.

The increment in lift coefficient afforded by a given flap design is a function of its area, and since its chord does not vary beyond 0.20-0.30 of the wing chord, it follows that an increase in slotted flap area can only come through increasing its span.

Obviously, the most satisfactory solution is the full-span flap, but this creates the need for some means of providing lateral control for the airplane, since it eliminates the conventional aileron. Finding a solution has involved a major research and development program extending over the past 15 yr., and still in progress.

▶ **Spoiler Research**—The idea of a "spoiler," a flat or curved surface which moves upward into the airstream to "spoil" the lift of one wing panel and thereby cause it to slow and drop, creating the desired roll and bank, was investigated as early as 1932 at the National Advisory Committee for Aeronautics.[1]

Fred E. Weick, who later created the famed Ercoupe, and Joseph A. Shortal examined the spoiler as a means of providing lateral control at high lift coefficients, when conventional aileron control loses much of its effectiveness. (An angle of attack of about 10 deg. is the maximum at which conventional ailerons provide adequate lateral control; most conventional airfoil sections develop their maximum lift at 12-18 deg.) Their investigation of a spoiler mounted 0.20 chord from the leading edge revealed an adverse yawing effect at low spoiler deflections, which was reduced progressively as the spoiler location was moved toward trailing edge.

• **Flight Test Investigation**—This wind tunnel research was supplemented by flight tests on various spoiler systems, and by 1934 the basic problem of the spoiler had been clearly identified and a solution proposed.[2] These flight tests revealed a serious lag between the movement of the controls by pilot and response of the airplane in roll. Although this lag was only ¼ sec., it provided unsatisfactory control. Weick suggested a combination spoiler and conventional aileron system as the solution to this problem, a method which found wide favor and still in use today.

Further flight tests the following year on various configurations revealed that a lag of 1/10 sec. was not noticeable by pilot, thus establishing this lag time as a basic design criterion.[3] These tests also revealed that not only did the use of spoilers effectively reduce control forces but that all control "feel" disappeared at low spoiler deflections. This lack of control force eliminates the desired "self-centering" requirements for a lateral control system[4] and makes lateral control by spoilers alone impractical, at least with present designs.

Concurrently with these spoiler tests, research on the "slot lip" aileron was being conducted and it was not until 1937-38 that analysis of a wide variety of forms of both types revealed the spoiler design superior because of its favorable yawing moment throughout the greater portion of the flight range, its small adverse yawing moment at high lift coefficients with flaps extended,[5] its superior rolling moment and low control force.[6] This research cleared the way for concentration on the spoiler to the exclusion of less promising designs.

▶ **Spoiler Applications**—First production airplane to incorporate spoiler panels for lateral control was the Northrop P-61 Black Widow night fighter, design of which was started in the fall of 1940 and the first airplane being delivered in July, 1943. A total of 706 P-61 fighters was delivered, the deadly craft saw service in all the major war theaters, and is still in use with the Air Force. The P-61 system employs perforated, circular spoiler panels located at 0.72 chord and extending from 0.49 to 0.83 of the semi-span.[7] A conventional aileron extends from 0.83 to 0.94 of the semi-span and has a 0.17 wing chord. Early flight tests of this system revealed severe spoiler vibrations, which were eliminated by sealing the slot gap. Test pilots also reported a decided loss of lateral control effectiveness with flaps extended and this was corrected by sealing the outboard flap slot.

Following correction of these two deficiencies, the P-61 proved highly successful and pilots who have flown it are enthusiastic about its unconventional control system, which displayed light control forces, favorable yawing moments, remarkably good control at the stall, and increasingly good control with wing flap extension.

A second airplane employing spoiler lateral control is the Hughes XF-11[8] on which extensive wind tunnel research was carried out.[9] In the course of these investigations it was clearly revealed that spoiler thickness, rear gap size, and bevel angle of the spoiler upper thickness greatly affect the hinge moment characteristics.

These studies indicate that a thin spoiler panel in combination with a fairly large rear gap is the optimum configuration, although care must be taken in the determination of this gap width since it can create up to 12 percent increased minimum wing profile drag. These tests also revealed enough similarities between spoiler and conventional aileron design as regards spanwise rolling moment effectiveness to warrant the use of standard aileron design data in the preliminary design of spoilers, greatly simplifying the research and design problem.[10]

• **Structural advantage** of spoilers, as compared with ailerons, is evident from the greatly reduced wing twisting moments created by spoiler deflections, according to research results.[11] This phenomenon is created by negative pressure coefficients existing behind the extended spoiler, which reduce positive pitching moment tendencies and actually create negative twisting moments near the tip; as a result, lowest twisting moments may be obtained by locating the spoiler panel as near the wingtip as practicable.

• **A promising characteristic** of spoiler control is that its effectiveness increases with speed, the reverse of conventional aileron controls.[12] Tests also reveal spoiler effectiveness in inverted flight, permitting prolonged maneuvers in this attitude. Spoilers have also shown promise as both lateral and directional control means for sharply swept back wing planforms.[13]

• **An improved type of spoiler** is now available, which consists of a plate mounted at right angles to the spoiler panel to provide a seal for the otherwise rear gap when retracted and to provide

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essential control "feel" and progressive stick force throughout its range of movements. Research on this "plug" spoiler indicates that its eventual form may include an adjustable plate.[14]

One of the interesting ramifications of spoiler control is its use on tail surfaces to reduce rudder pedal and stick forces. However, an extensive test program on various configurations proved the spoiler totally unsatisfactory by its creation of high drag, erratic action, and an adverse effect on normal control surface hinge moments.[15]

• **Latest practical utilization** of spoilers for lateral control is on the Martin XB-48, six-jet bomber, now undergoing flight test at the Glenn L. Martin Co., Baltimore, Md. and Naval Air Station, Patuxent, Md. It features the proved combination of spoiler panels and small, feeler ailerons mounted at the tips.

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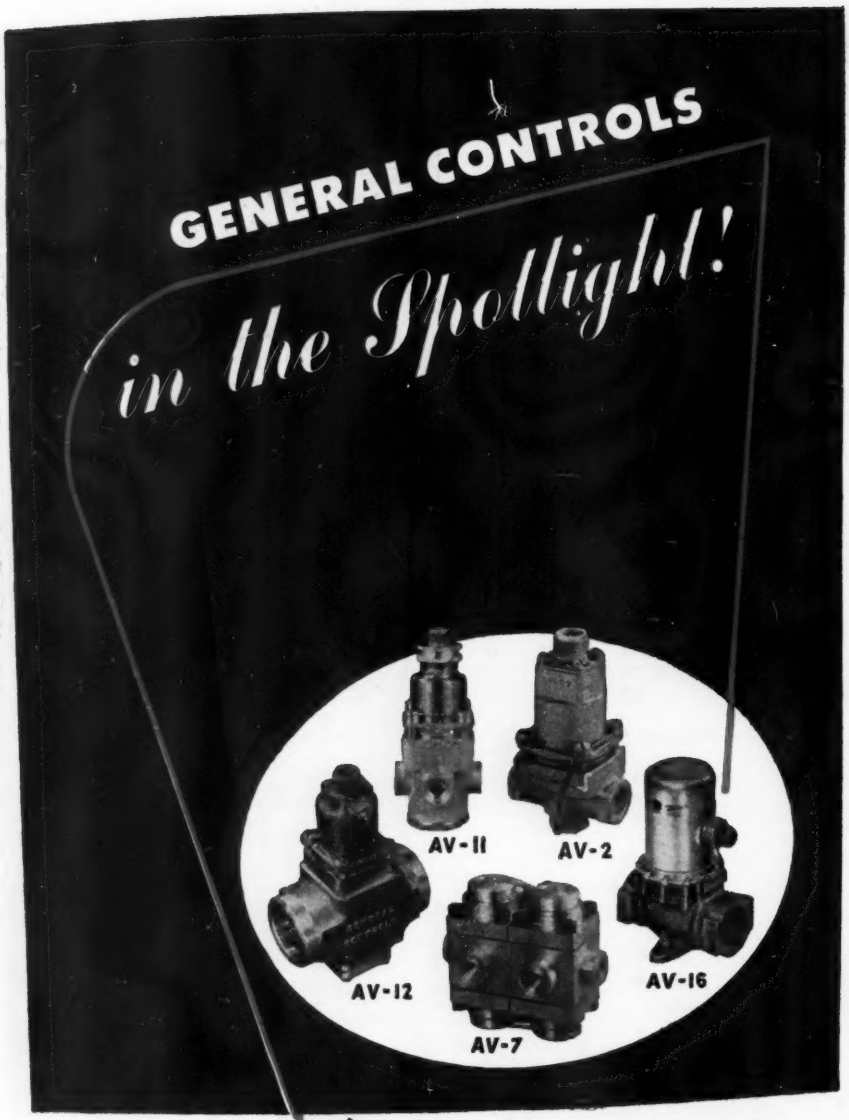

Unsurpassed *hi-g valves for aircraft**

FOR AUTOMATIC PRESSURE, TEMPERATURE AND FLOW CONTROL

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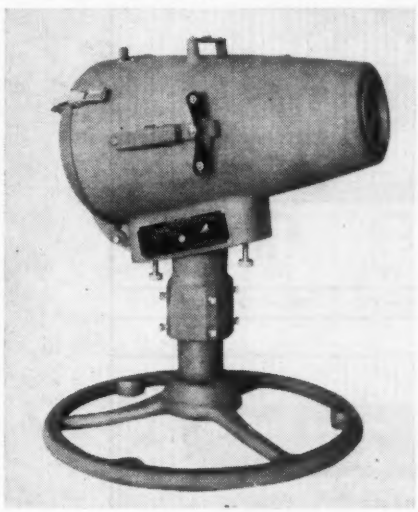
NEW AVIATION PRODUCTS

Approach Angle Indicator

Weighing under 50 lb., portable angle-of-approach indicator, movable about field, is announced by **Westinghouse Electric Corp.**, P. O. 868, Pittsburgh 30, Pa. Similar in performance to units designed for permanent mounting, new indicator has special base for temporary mounting. Used to give to incoming pilot continuous information as to his proper approach altitude, three-



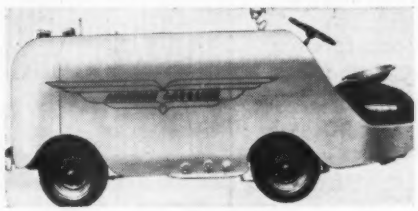
colored light beam appears flashing yellow if he is too high, flashing red if too low, and flashing green if at correct altitude. Beam is flashed 40 times per min. to make indicator distinctive from other steady-burning colored lights. Special lens arrangement keeps very sharp division line—about 5 ft. in mi. —between different colored beams, insuring signal accuracy. Circular spirit level is mounted on housing for precise setting. Quadrant arm with level on housing side provides for accurate setting of approach angle, and sights are provided for aiming. Unit requires approximately 105w. at 115v. and can be plugged into 115v., 60c. supply line.

Spray Booth Coating

For paint application processes in aircraft and accessory plants and overhaul shops, new coating compound, Triad PRD, for spray booth walls is offered by **Detrex Corp.**, Box 501, Detroit 32, Mich. Compound, usable on wet and dry booths, but especially advantageous for dry installations, is light-colored, semi-liquid material applied with brush or gun. For spraying, 20% dilution produces viscosity that can be handled in pressure tank. Coating with adherent paint film is readily scraped off without previous soaking, or can be easily removed by flushing with hot or cold water. Paint overspray adhering in solid film can be peeled off in sheet.

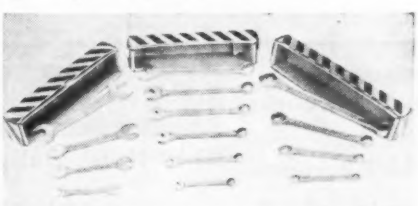
Airport Servicer

Of interest to airport operators, is new series 5000 self-propelled servicer with power take-off pump, made by **Harman Equipment Co.**, 3605 E. Olympic Blvd., Los Angeles 23, Calif., and designed with interchangeable dispensers for use as Fuel-A-Plane model for aviation gasoline or Lube-A-Plane type for dispensing oil. Dispensing hose is attached to automatic boom equipped with leak-proof ball bearing swivel joints, eliminating dragging of hose over wing surfaces. Automatic shut-off safety fill nozzle is provided. Also included are internal safety valve, engine control button operated from either nose or driver's compartment, and separator-decontaminator to remove water from gasoline and restrain dirt, fine oxides, and other foreign matter. Available are single or multiple compartment storage tanks of 200, 400, or 600 gal. capacity. Fuel is dispensed at 15 to 50 gpm.; engine oil of typical grades from 5 to 30 gpm. according to temperature-viscosity conditions.



Maximum-Use Wrench Sets

Designed to provide popular opening sizes, three basic end wrench sets are announced by **Plomb Tool Co.**, Los Angeles 54, Cal. Set 3000BA includes four open end wrenches, with openings of $\frac{1}{4}$, $\frac{5}{16}$; $\frac{3}{8}$, $\frac{7}{16}$; $\frac{1}{2}$, $\frac{9}{16}$; and $\frac{5}{8}$, $\frac{3}{4}$. Set 1100BA includes four box wrenches, with 12-point box openings of $\frac{5}{16}$, $\frac{3}{8}$; $\frac{7}{16}$, $\frac{1}{2}$; $\frac{1}{2}$, $\frac{9}{16}$; and $\frac{5}{8}$, $\frac{3}{4}$. Set No. 1200BA includes six combination box and open end wrenches, with openings of $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$ and $\frac{5}{8}$. Each combination wrench has open end and 12- point box opening of same size.



Air-Operated Impact Wrench

New impact wrench, Size 18-6, announced by **Keller Tool Co.**, Grand Haven, Mich., has nominal capacity of $\frac{3}{8}$-in. bolts with power to set nuts that ordinarily require nut setters many times the size and weight. No springs, gears, or clutches are used. Rotary type air motor furnishes speed and power for fast nut running. Built-in torque regulator adjusts power to requirements of job. Tool can be operated in reverse by turning valve. Unit's length is $8\frac{7}{8}$ in.; weight, 9 lb.

Information Tips

Air Law and Commerce

Of interest to aircraft manufacturing executives, airport operators, and private fliers, is "Journal of Air Law and Commerce," publication of which has been resumed with winter issue, 1947, by **Northwestern University**, 357 East Chicago Ave., Chicago 11, Ill. In addition to regular articles, publication features quarterly reviews of government activities embracing state and local, federal, and international reports. Journal is published quarterly.

Printed Circuit Techniques

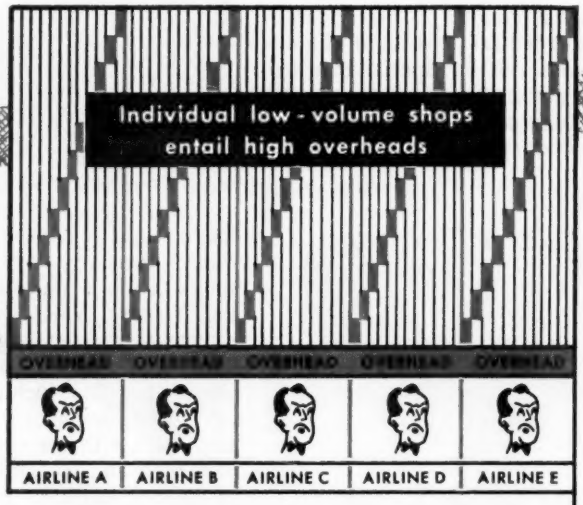
An aid to design and production engineers in aircraft industry electrical phases is first comprehensive treatment on printing electronic circuits, published by National Bureau of Standards, and issued as 43-page illustrated pamphlet "NBS Circular 468, Printed Circuit Techniques," by **Superintendent of Documents, U. S. Government Printing Office**, Washington 25, D. C. Price is 25¢. Methods of applying wiring and circuit components directly to insulated surface, thus combining ruggedness with high degree of miniaturization, are presented under topics of painting, spraying, chemical deposition, vacuum processes, diestamping, and dusting. Performance and application details, as well as precautions and limitations are discussed. Many applications and examples are given, including printed amplifiers, transmitters, receivers, plug-in units, and electronic accessories. Section on comparative performance of printed circuit elements is provided, while bibliography covering processes, patents, applications, and other relevant matters is included as supplement.

Small Tool Maintenance

For shop superintendents, circular titled "More Efficient Small Tool Grinding" describing Model G3 grinder, is issued by **Corlett-Turner Co.**, 1001 So. Kostner Ave., Chicago 24, Ill. Illustrations show everyday applications of machines.

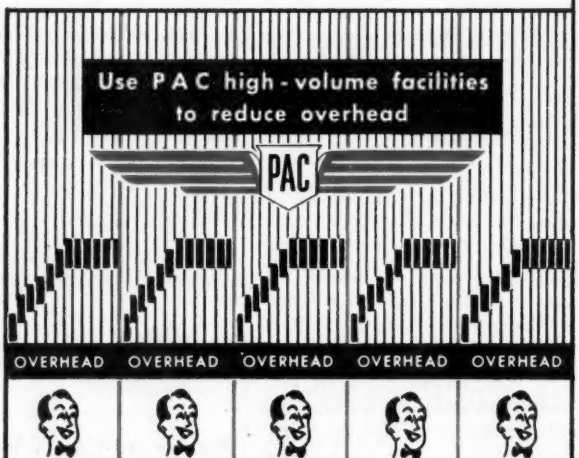
question for airline executives...

Why Not Share Maintenance Costs?



Why should airlines pay the high cost of owning and operating individual maintenance bases?

Isn't it wiser business strategy to avoid capital expenditure and excessive maintenance overhead by using the high-volume facilities of Pacific Airmotive, whose large shops are supported by work for more than 60 airlines?



When you analyze the problems of costly maintenance overhead, it becomes clear that large, well-equipped bases are economically feasible only if they can be operated continuously at near capacity.

When maintenance requirements drop, revenue often drops at the same time. During these times, large maintenance bases become a real liability. However, there *is* a satisfactory, well-proved method of avoiding this dilemma.

You can obtain from Pacific Airmotive prompt, reliable maintenance—including engine, engine-accessory, propeller, and instrument overhaul as well as airframe and other service—without investment in expensive shops and tooling, and without paying a premium price.

In effect, you are sharing PAC's facilities with more than 60 other airlines. The large total volume from all our clients enables us to provide maintenance and contract overhaul to each at rock-bottom prices for quality work.

If you are concerned with paring unnecessary overhead, why not get in touch with our service department at any one of our major service bases listed below? We have factual information we believe you will find interesting.

PAC SERVES MORE THAN 60 OF THE WORLD'S AIRLINES

SUPPLIES... PAC distributes more than 300 aviation lines through nine bases in the U. S. and Alaska. This includes engine, accessory, prop, and instrument parts and assemblies.

SERVICE... PAC furnishes engine, engine-accessory, propeller, instrument, and airframe maintenance or contract overhaul at five major bases in the U. S. and Alaska.

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FINANCIAL

Disappointing Airline Earnings To Show in 1947 Annual Reports

Continental, Eastern and Western only three likely to reflect profit when scores are in; National's position analyzed on basis of December, 1947, financial report.

Airline annual reports soon will appear in final form and spell out in detail the disappointing earnings results for 1947. It is probable that only three of the major carriers will be able to report a net profit for last year. These companies are Eastern, Western and Continental.

Eastern most likely will be the sole carrier to show earnings as a direct result of its operations without any benefit of special adjustments in the mail rate or from the sale of property. Despite a particularly difficult second half which witnessed the installation of Constellations and a decline in the normally highly profitable winter traffic, Eastern during 1947 is expected to have maintained its unbroken earnings record, established since the inception of the company.

Preliminary reports indicate that Western may have finished 1947 with a small profit. This showing, however, is primarily due to the profit realized on the sale of Route No. 68, Denver to Los Angeles, to United Air Lines.

▶ **Continental First**—Continental Air Lines is the first to release final results for last year, on an unaudited basis, and shows a material increase in profits for 1947 over 1946. The company reported a net income of $116,411 equal to 43 cents a share on the 271,906 shares of common stock outstanding. This compares to $17,939 for 1946 or 15 cents per share. Passenger revenue declined from $3,718,740 for 1946 to $3,005,426. The company recently received a very favorable adjustment in its rate of mail compensation from the Civil Aeronautics Board, which is primarily responsible for the improved financial showing.

It is interesting to observe that Continental was one of the few carriers accepting a CAB mail rate show cause order without a contest. The new mail rate was established on an incentive basis with a sliding scale adjustment for increases in the passenger load factor. This was the pattern first followed for Pioneer and also recently adapted to compensate Colonial for operations on its route to Bermuda.

▶ **National Analyzed**—National Airlines recently released its financial statement for December, 1947, making possible an analysis of the full year's results. The company's fiscal year ends June 30, hence its current report cannot be regarded as if it were the company's annual statement.

For the year ended Dec. 31, 1947, National reported a net operating loss of $1,163,869. This compared with the net operating profit of $984,259 shown for 1946. However, carryback tax credits and other items reduced the company's net loss to $865,302 for 1947. The carrier has an application for increased mail pay pending before the CAB which it filed during 1947. If successful in its plea, retroactive mail pay, effective to the date of filing the application with CAB, may substantially reduce if not completely eliminate last year's deficit.

▶ **Accounting Changed**—A number of footnotes call attention to some interesting aspects of the company's operations. As a result of CAB instruction, National, during the year ended June 30, 1944, changed its method of accounting for passenger revenues from the previous practice of taking such revenue into income on the basis of tickets sold to the procedure of stating such revenue as income on the basis of transportation actually furnished. In the company's federal income tax returns for the years ended June 30, 1944 to 1947, passenger revenue was reported on this revised basis.

Another agency of the U. S. government, the Bureau of Internal Revenue, however, proposed additional taxes for the years 1944 and 1945, disallowing the change in bases of reporting passenger revenues as income—a change instituted at the insistence of the CAB, another arm of the U. S. government. Subsequently, on July 31, 1947, the Tax Court of the United States upheld the Bureau of Internal Revenue and National was ordered to pay an estimated $60,000 covering additional income taxes and penalties for the two years involved.

National's footnote states: "In a letter dated Oct. 15, 1947, the company was advised that in view of additional information furnished to the Treasury Department officials, the Bureau concluded that passenger revenue reported on the basis of transportation furnished conforms with Treasury regulations and clearly reflects income and therefore granted the company permission to report passenger revenue on this basis beginning with the year ended June 30, 1946, provided the company waived any and all rights of action with respect to the deficiencies for the two years previously referred to. . . ."

▶ **Agency Accord**—In other words, the two agencies of the government are now in accord as to this tax treatment. Further, the Treasury Department has in effect intimated that maybe it was wrong in insisting on those additional tax payments for 1944 and 1945 but would prefer to forget about the entire matter.

National will ultimately reap some benefits in tax relief through carryback tax credits. Due to anticipated operating losses for the fiscal year ending June 30, 1948, the company will be entitled to carryback tax refunds for the years ended June 30, 1946, and June 30, 1947. The company thus is relieved of the liability of further instalment payments on 1947 taxes and will become entitled to the refunds estimated at $192,000 covering the first instalment of the 1947 tax and the entire 1946 tax, all of which have already been paid.

▶ **Enlightened Attitude**—National probably has assumed one of the most enlightened attitudes among the airlines in the issuance of financial statements. The company usually is first in the industry in reporting monthly results. Of greater significance, National has made available to all having legitimate interest in its affairs a copy of its detailed monthly statement immediately following its completion. This has been a consistent policy whether operations were in the black or in the red. This is recognition of the public interest enjoyed by the carrier as well as a procedure which leads to confidence in its affairs.

The air transport industry, in continuing need of additional capital funds, on the whole has been very backward in fostering sound stockholder relationships. For example, it is not too difficult to cite instances where a company has given loud lip service to promoting better stockholder associations, yet has been most inept in the manner in which operating results have been released to those interested.

—Selig Altschul

Airport Legal Battles Point To Future Handling Problems

Whiteman Airpark and Chamberlain Airport cases set precedents in nuisance complaints against fixed base operations.

Two case histories of close-in airports and their legal battles against neighborhood complaints of airport nuisance provide a useful background in public relations and legal procedure for all airport operators who may encounter similar problems.

• **Whiteman Airpark,** Pacoima, Los Angeles was subjected to a legal abatement proceedings by 165 citizens living in the neighborhood.

• **Chamberlain Airport,** in the Fairlawn residential section of Akron, Ohio, won the right to build its 450 acre airport by a Ninth Ohio district Court of Appeals decision against complaining nearby residents.

Petitioners in the Whiteman case were residents within a radius of one mile of the field, who brought suit against Andy Devine, motion picture actor, Dick Propert, and the Devine-Propert Corp., operator of a flight school on the airport and asked general damages of $1,000,000 for the following alleged acts of nuisance:

• **Aircraft noise.**
• **Fear of injury from falling aircraft.**
• **Dust stirred up by planes.**
• **Damage to houses from vibration** of low flying aircraft.
• **Damage to chicken and rabbit production** from low flying aircraft (complaint alleged the rabbits were "frustrated").
• **Damage from objects and oil** falling from aircraft.

Complaint said that planes from Whiteman Airpark flew within 30 ft. or less of plaintiffs house creating noise and vibration which caused the houses to shake and sway; frightened chickens so that they flew against the walls of their coops killing themselves; interfered with plaintiffs' conversations, prevented plaintiffs from sleeping and caused them to become nervous and ill.

Following filing of the abatement proceedings the airport management sought to mollify the neighbors by strict enforcement of a CAA approved traffic pattern, and banning of noisy types of planes. But the neighbors remained adamant. Motion pictures showing low flying aircraft, and the alleged fright of chickens and other livestock were prepared by the plaintiffs.

▶ **Plaintiff Canvass**—A systematic canvassing of the 165 plaintiffs, using a court stenographer to take depositions from them, was then started by the management, a task which lasted nearly two months with depositions from approximately half of the group. A firm of private investigators and three full-time airport employees were used in preparing the depositions.

The depositions indicated that the only real adverse witnesses were members of the grievance committee which originated the petition, but that a large number of those interviewed had signed the petition to be "neighborly" but either had never objected to the airport, or admitted that the new traffic pattern and procedure had relieved their objections. Approximately 75 percent of persons interviewed were favorable witnesses for the airport.

▶ **Agreement Sought**—After taking the depositions, the Airpark management was in a position to obtain agreement from the plaintiffs on a stipulated judgment. This calls for adherence to present traffic pattern, reporting violations of the pattern barring operation of C-47 and larger airplanes from the field. This last restriction is meaningless since the airport size does not permit safe operation of this type plane.

Bertrand Rhine, attorney for the

ADMA OFFICERS AND DIRECTORS

Officers and directors of the Aviation Distributors and Manufacturers Association, are shown following the recent meeting at Dallas. Left to right: first row, H. Donald Richards, ADMA secretary; Walter B. Hawkins, Air-Parts, Inc.; Richard N. Bomberger, ADMA vice president, Sensenich Corp.; R. B. Kenty, ADMA president, Air Associates, Inc.; G. B. Van Dusen, ADMA vice president, Van Dusen Aircraft Supplies, Inc.; A. M. Recker, Goodyear Tire & Rubber Co., Inc.; second row, W. B. Matthews, Western Aero Supply Corp.; James Riddle, National Aviation Radio Corp.; Earle M. Scott, Scott Aviation Corp.; Lawrence Zygmunt, General Aircraft Supply Corp.; R. D. Hicks, Continental Motors Corp.; Charles F. Irons, and Ray Snyder, both of Snyder Aircraft Corp. Headquarters for the distributors and manufacturers group is in Philadelphia.

Whiteman Airpark interests points out that a proper public relations job at the time the airport was opened would have eliminated much of the difficulty. If the neighborhood residents had known that a strict pattern was being enforced and that violators were being fined by a local court, in the early stages there would have been little reason for the formation of the grievance committee and the filing of the abatement proceedings.

The Chamberlain Airport ruling set aside a previous injunction granted by Common Pleas Court, to prevent completion and operation of the airport.

▶ **Dangerous Decision**—Danger of the Common Pleas Court decision to airports generally was the fact that it would have limited future airport construction to owners of airport sites containing 16 square miles of area. In other words, the court ruled that an airport to avoid being classed as a nuisance must be large enough so that planes using it would be able to enter or leave the field at not less than 500 ft. minimum altitude over adjacent property. If CAA recommendations of a 20 to 1 glide angle were followed, the field would require a minimum area of 16 square miles.

There are few airports, in the U. S., if any, which would qualify under such a ruling.

The reversal of the higher court pointed out that the Federal government has placed navigable air space in the public domain and not subject to private ownership and control. It pointed out the CAA ruling that navigable air space was defined as 500 ft. above non-congested areas and 1,000 ft. above congested areas except when necessary for takeoff or landing.

"We must recognize that establishment of an airport of the kind contemplated is of great concern to the public and if such an airport is abated or its establishment prevented, the consequences will not only be of serious injury to the owner, but may be a serious loss of a valuable asset to the entire community. Undoubtedly the plaintiffs will experience some discomfort but that is one of the incidents or results of living in a heavily populated, highly industrialized state."

Stephens College Award

The 1947 aviation educational award was presented to Stephens College for Women, Columbia, Mo., by Stinson Division, Consolidated Vultee Aircraft Corp., in recognition of the college's pioneering work in aviation education for women. Presentation was made by William H. Klenke, Jr., Stinson general sales manager, to Kenneth Newland, aviation department and occupations division head. A total of 6,000,000 air miles have been flown by Stephens College student pilots without a serious accident, and the Stephens flight program now in its seventh year, is credited with training one-twelfth of all the women now engaged in commercial aviation.

CESSNA CASTERING GEAR

First photo of Cessna 140 equipped with the new Goodyear castering wheel for cross wind landings. Gear is approved for optional factory installed equipment at $340 added cost, plus wheel tradein.

Pricetag of $4,795 For Aeronca Sedan

Lowest 1948 four-place plane price yet—$4,795 flyaway, was announced last week for the new Aeronca Sedan, by Aeronca Aircraft Corp., Middletown, Ohio, which promised deliveries beginning in March.

Plane has an all-metal wing and single wing struts, while fuselage and tail surfaces are fabric-covered steel tubing. It is designed for takeoffs and landings fully loaded on the same short fields that the two-placer Aeroncas use, although a stall speed of 53 mph., somewhat faster than the two-placers' stall speed is quoted. Rate of climb is given as 650 ft./min. with gross load. Sealevel cruising speed of 105 mph. and optimum altitude cruising speed of 112 mph. are quoted, with 40 gallons fuel capacity, stated to be sufficient for well over four hours cruising.

Aeronca Sedan has 37 ft. 6 in. wingspan, 25 ft. 3 in. fuselage, and is 7 ft. high. Engine is the new Continental 145 hp. powerplant.

Large door 37 in. wide provides access to cabin from a "buggy step." Pilot's seat is adjustable, front seats fold and rear seats are removable to provide cargo compartment. Cabin is soundproofed and insulated with heating for both front and rear seats.

Gross weight is listed at 2050 lb. with 900 lb. useful load. Plane has a 120 lb. baggage allowance.

Standard equipment at list price includes twin landing lights, for glide path and taxi mounted in left wing leading edge, electric starter, 12 volt engine driven generator and battery, hydraulic toe brakes, glove compartment, engine mufflers, parking brake, ash trays, and steerable full-swivel tailwheel. A radio receiver transmitter will be installed at the factory as an optional extra.

Bonanza Price Hike

Increase in the price of the Beech four-place Bonanza personal plane to $9,445 flyaway Wichita, was announced last week, a $500 rise from the former list price. Officials said the price increase barely covered increases which had been made by its suppliers in costs of materials and components, and expressed the hope that no additional increase in the Bonanza price would be necessary in 1948.

BIG NEWS FOR '48!

The Improved ERCOUPE Has More Power—

Greater Weight Allowance — Bigger Nose Wheel

. . . and is still the world's safest* airplane

Everybody knows that the Ercoupe is spin-proof,* making it the world's safest airplane. They also know that this proven cross-country plane operates in winds that ground other light airplanes. The Ercoupe always was versatile. Now, with increased power and speed, the *improved* Ercoupe is more than ever the world's most useful airplane. The 85 h.p. engine will pull you at better than 110 m.p.h., giving 22 miles per gallon of gas. The larger nose wheel makes possible landings on softer, rougher fields. Greater weight allowance permits more capacity. Now, 2-way radio is included as standard equipment. Now, landing lights, blind flying equipment and other extras can be factory installed at slight additional cost. By all means, make it a point to fly in the *improved* Ercoupe . . . You'll soon see for yourself why it's the world's most talked about personal plane.

**The only airplane certified spin-proof by CAA*

Tomorrow's Plane—TODAY

the Improved ERCOUPE

For further information, see your dealer—or write to

SANDERS AVIATION, INC. • Riverdale, Maryland

World-Wide Distributors for Ercoupe Sales and Service

Photos of the plane indicate a strong family resemblance to the postwar Aeronca two-placers, the Champion and the Chief with generally good visibility from all seats and from pilot's viewpoint and back seats as well.

Post Office Studies New Star Air Mail Route Plan

Plans for using personal type planes as mail carriers on aerial "Star" routes similar to the auto "Star" contract routes operated for the Post Office Dept. for many years, are being considered by the Department (AVIATION WEEK, Dec. 15), it was officially announced last week.

Robert S. Burgess, deputy second assistant postmaster general said an experimental airmail Star route to serve the Maryland Eastern shore from either Baltimore or Washington, is being studied. There are a number of Eastern shore communities with adequate airports, whose mail service could be considerably improved by such a route.

Burgess indicated that existing legislation provides authority under which the new routes could be established, but there is a question whether the authority is in conflict with the Civil Aeronautics Act of 1938. Post Office Department will submit a report on the matter to Civil Aeronautics Board for discussion, he added.

Ground-to-Air Signals

CAA last week announced adoption of the nineteen panel symbols now used by the U. S. military services, for signalling to airplanes from ground, and added a 20th symbol, the international SOS call for help. Administrator T. P. Wright asked all pilots to become familiar with the symbols, so that they could recognize them from the air, or use them in emergency from the ground. Call for medical help is the simplest signal, a straight line panel 10 ft. by 2 ft. laid out on the ground so that it will be observed from the air. Chart showing the symbols and instructions for making them is available on request from CAA Office of Aviation Information, Washington 25, D. C.

Ryan in Milwaukee

Midwest Airways, Billy Mitchel Field, Milwaukee, has been named Ryan Navion distributor for most of Wisconsin, including Milwaukee.

NYATA Plans Convention For Feb. 12-13, in N. Y.

Insurance and legislation panels will highlight the first day of a two-day NYATA convention, scheduled to meet Feb. 12-13 at the Hotel Lexington, New York. Insurance leaders participating in the first panel will be Jerome Lederer, Frank Mara, and Bill Churchill. Conducting the legislation panel will be NYATA members Tim Cohane and Chuck O'Connor.

Members of the New York operators' organization, headed by Guy A. Ham, Jr., will hold their annual meeting and elect officers the afternoon of the first day.

CAA and Veteran Administration matters will be discussed on the second day, with special attention given to developments in the GI Flight Training Program. The afternoon session will be devoted to fueling and allied service problems.

Non-members as well as members are invited to attend the sessions, although only members may vote.

Luscombe Changes

Resignations of James P. Cunningham, Luscombe vice president in charge of production; James J. Brophy, secretary-treasurer; and James L. Camp, sales promotion director, were disclosed recently at Luscombe Airplane Corp., Dallas.

Otto W. Hoernig, assistant to the president in charge of sales and service, was elected to the Luscombe board of directors, replacing Cunningham, who has returned to Trenton, N. J., the former home of Luscombe. Stewart L. Whitman, auditor and tax supervisor, has replaced Brophy, who has joined a manufacturing firm in Oklahoma. Sydney Carter, former Washington aviation writer, has joined the Luscombe sales promotion department.

Goodyear Plane to Europe

A Goodyear GA-2 Duck amphibian, equipped with cross-wind landing gear built by Goodyear, is being shipped to Europe for flight demonstrations of the unique gear at various airports in the British Isles and on the Continent. The 145 hp. three-place plane is the same type as those which have been demonstrated and service tested by American fixed base operators in various sections of the country, and the European demonstrations will provide a further service test on the plane, as well as on the cross-wind castering wheels. All the other amphibians have completed their tests in this country and have been returned to the Goodyear plant in Akron. Results of the tests are being tabulated and are due to be announced at an early date.

BRIEFING FOR DEALERS & DISTRIBUTORS

TAYLOR WINS—C. G. Taylor continues as president of Taylorcraft, Inc., and his lightplane company remains in Alliance, Ohio, it was decided after a recent all-day shareholders meeting at Canton, Ohio, which continued far into the night. O. F. Nesmith, vice president in charge of sales, who spearheaded an opposing faction which sought to move the company to another city, resigned along with four directors: J. J. Gregg, Grand Junction, Colo.; F. C. Swinton, Pratt, Kan.; E. G. Barnet, Wisconsin Rapids, Wis., and Rupert Aldrich, Norway, Maine. Taylor and Ben J. Mauro, Ambridge, Pa., board chairman, had sought court action to prevent the Nesmith group from ousting Taylor and moving the plant. In a cross-petition the Nesmith group asserted that Taylor had resigned and that the company's lease on its present quarters had expired and it was necessary to find a new home. The Nesmith group also asked $50,000 in damages, claiming that the Mauro-Taylor petition had injured the company's business. A common pleas court order had frozen the company status pending the stockholders meeting.

TOURING COMPETITION—Five American lightplanes will be eligible to compete in an international lightplane "Tour de France" sponsored by the Aero Club of France, Aug. 27 to Sept. 5 over a course of 3,280 kilometers (2,138 miles). Fee of $25 must accompany each entry, to be sent in this country, through the National Aeronautic Association, 1025 Connecticut Avenue, Washington, D. C., by Mar. 1. Two, three and four place planes will be admitted with maximum empty weight limits of 1,764 lb., 2,646 lb., and 3,748 lb. respectively.

EXPANDING LAKE STRIP—Cleveland's lakefront airstrip will be lengthened 500 ft. at the east end, increasing the strip to 2,500 ft. length, and an additional 500 ft. will be added the following year, when the fill has had time to settle. Other improvements this year will include a seaplane ramp and 300 ft. dike for a protected anchorage and an administrative building, also providing shelter for fire apparatus, and toilets. Completion of the permanent lakefront landing field which will have 5,000 ft. runways will require at least six more years.

DICK DEPEW—Richard Henry Depew, Jr., 55, who died recently at his Garden City (L. I.) home of a cerebral hemorrhage, had been a pilot since 1911 and was closely associated at various times during his aviation career with virtually every phase of the industry. He was director of domestic sales of Frank Ambrose Aviation Corp., Flushing, at the time of his death. Previously he had held such varied aviation jobs as executive vice president of Taylorcraft Aviation Corp.; chief of aircraft disposal section, War Assets Administration; test pilot for the aviation section signal corps, at McCook Field, Dayton; Argentine manager of Curtiss Aeroplane Export Corp., with headquarters at Buenos Aires; chief pilot and manager of flight division, Fairchild Aviation Corp.; manager of Curtiss Flying Field (now Roosevelt Field) at Mineola, N. Y.; demonstration pilot for Pitcairn Autogiros. He learned to fly in the Maurice Farman school in France, soloing on Aug. 13, 1911, and when he received license No. 641 from the Federation Aeronautique Internationale was the second youngest licensed pilot in the world. He had logged more than 3,000 hr. in more than 100 types of aircraft, with more than 50 types of engines, including American, British, French and German. His variety of pilot experiences as instructor, test pilot, army flyer, exhibition pilot, charter flyer, aerial photographer's pilot, and sales demonstration pilot, has been equaled by few.

NASAO NOISE POLL—Questionnaire circulated by National Association of State Aviation Officials on external aircraft noise brought replies from 17 air carriers, 14 aircraft manufacturers, six engine companies, and three propeller firms. Consensus of replies, as reported by NASAO research development committee, includes: air carriers appreciate importance of noise reduction and are attempting to reduce ground complaints by changing airport traffic patterns; manufacturers are working on mufflers and new design propellers, but are not unanimous in upholding noise reduction, due to increased weight penalty of multi-bladed propellers; transport and military plane manufacturers are doubtful about prospects for technical noise reduction in their field; helicopter companies are working on mufflers; propeller companies are willing to cooperate but "pass the buck" to airframe and engine companies; engine companies were "concerned" and advised states not to pass noise regulations; jet engine manufacturers expect that aircraft noise complaints will be aggravated as these powerplants come into more general use, and urged military cooperation for noise reduction practices.

—ALEXANDER McSURELY

Air France to Open All-Freight Services

Company to concentrate on more frequent service over present lines.

PARIS—Air France operations during 1947 ran up a deficit of about $8 million, on a total business which brought in approximately $46 million, according to preliminary indications furnished by the company.

For 1948, freight haulage will be pushed, with the opening of several new all-freight services and more space allocated to freight on passenger planes. In the passenger field, which accounted for 74.6 percent of 1947 revenues, not so many new lines will be established this year; instead more frequent service will be offered on present lines.

By mid-year all the company's European lines should be equipped with four-motor planes, the new French 33-passenger Languedocs equipped with P & W engines. Fifteen of these are already in service, not only on the France-North Africa runs but also since Jan. 21 on Paris-London and Paris-Geneva. Twenty-five more should be delivered by June, replacing DC-3s, which in turn can supplant JU52s and Lockheed 60s. Five new L-749 Connies are also awaited for the North Atlantic service, and six DC-3s.

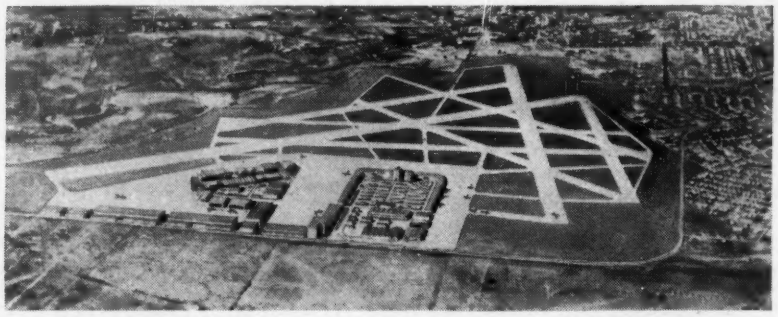
▶ **Subsidy to Meet Loss**—Air France's operating figures do not take account of losses on the France-West Indies line established in the fall of 1947, which has been given a $300,000 government subsidy, nor losses on the Saigon-Shanghai extension and interior Indochina lines. Most of the loss shown will be met by a $6,700,000 government subsidy voted early last year.

Company officials explain the loss as due chiefly to delay in delivery of new equipment, continued use of the unprofitable JU52s, and wage increases.

▶ **Receipts Increased**—They point out that Air France, like the BOAC, is forced as a part of the government's imperial policy to operate a number of lengthy unprofitable lines. Unduplicated length of their network has increased, for example, from 26,000 miles in 1938, to 61,000 miles in 1946, to 87,000 miles today. Nevertheless the percentage of receipts to costs has increased from 40 percent in 1938, to 75 percent in 1946, to 85 percent in 1947.

There is little hope, however, that deficit operation can be ended in 1948.

Passenger miles increased to about 380,000,000 in 1947 from 210,000,000 in 1946, and ton miles (in metric tons of freight and mail) to about 10,000,000 from 6,200,000. Direct costs declined from 58 percent of the total to 55 percent.



MELBOURNE PROPOSES TRANS-PACIFIC TERMINAL

Melbourne's bid to become the terminal airport in trans-Pacific flights has the backing of Australia's Department of Civil Aviation, which is working on a four-stage program to make a model field of Essendon Airport, Melbourne. The main runway in the double runway system of four parallel runways will be 7,000 ft. long. Airline offices will be housed in a U-shaped "loading coastline," with multi-story airport control and administration building at the base of the U. When completed, the airport will be able to handle 800 aircraft movements a day, three times the present volume.

Future Charted For Hindustan Aircraft

Bangalore plant assumes varied role under government control.

BANGALORE—Hindustan Aircraft Ltd., which started as a warplane manufacturing concern, served through the war as Southeast Asia's key maintenance base, and did important work in equipping India's merchant air fleet, has at last had its immediate future charted by the Indian government which controls both its finances and its policies.

The new role is a multi-purpose one for the time being, with stress on eventual resumption of full aircraft production. But where original pattern was 100 percent American, slowly yielding after the war to the British, the present aim is full Indianization—even going so far as the development and construction of indigenous planes.

Aircraft have a back seat at present. Besides continuing overhaul and conversion work for Indian airlines, workers are now assembling 15 Percival trainers from major components for the RIAF for a December deadline. Following that another five are to be assembled from detailed parts, and then work is to begin on manufacture of everything but engines and instruments with 15 Indian-built craft due by June, 1949.

▶ **Coach Contract**—Major item on the plant's books is a contract to construct 100 railway coaches along aircraft principles at a cost of $18,000 each. Railway rolling stock is one of India's most pressing needs right now, and Hindustan Aircraft is working on new designs with further contracts expected. Other miscellaneous work includes fabricating towers for Mysore State power transmission lines and manufacturing steel doors and windows for the Mysore government, which owns a minor interest in the company.

At present the personnel strength is 3625, of whom 16 are British and only seven Americans—a far cry from the wartime period when about everything, down to the chewing gum on the floor, was almost pure American in method and machinery.

ICAO Statistics Division Resumes Reports

MONTREAL—Resumption of statistical reports received important consideration by the statistics division of the International Civil Aviation Organization in their recent session at Montreal. The reports lapsed into disuse during the war.

IATA Traffic Conferences Discuss Problems at Cairo

Traffic Conference No. 2 of the International Air Transport Association will seek conformity with other similar IATA groups at a joint meeting of international airline operators at Cairo this week.

Main session of Conference No. 2, which also will discuss summer schedules and improvements to the IATA Air Guide, will consider changes in regional arrangements to fit the worldwide rate and tariff pattern, conditions of carriage and agency matters established by October's first joint meetings of the three IATA conferences at Rio de Janeiro.

Starting Feb. 10, the sessions of the three conferences are expected to continue for a week, with that of No. 2, comprising Europe, Africa and the Middle East, the principal meeting.

This conference also will meet jointly with each of the other two. No. 1 covers the Western Hemisphere, including Greenland and the Hawaiian Islands, No. 3 Asia, Australia and the islands of the Pacific. The joint meetings probably will examine and revalidate resolutions on rates and fares over routes between the regions, on which existing resolutions expire this summer.

De Havilland Drover Makes Initial Flight

SYDNEY—The three-engine Drover light transport, first aircraft wholly designed and built by the Australian de Havilland Co., recently made its first flight in Sydney, New South Wales.

Cables described the 20-min. flight, which included all normal maneuvers, as "most satisfactory." Structure weight was reported slightly below estimates, indicating a possible increase in payload.

Powered by 140 hp. Gipsy Major engines, the metal monoplane normally will seat six passengers and carry a payload over half a ton at about 135 mph. for a still-air range of about 500 miles.

The Drover was designed to replace Dragon biplanes of 1932 design built for war training and since used for commercial work in country districts. Further details of the new plane appeared in AVIATION WEEK Dec. 22.

GCA at Liverpool

LONDON—Speke Airport, Liverpool, will have GCA equipment, becoming the third airport in this country so equipped. Others are London Airport and Prestwick (Ayrshire). Similar equipment is to be installed at Northolt, Belfast and Boyingdon, at two months' intervals, in that order.

Shanghai Letter:

Airlines Show Upward Trend

SHANGHAI—As 1947 closed, commercial aviation in China passed its greatest year of crisis. The year opened bleakly in the wake of three Christmas Day crashes. Three more airliner crackups followed rapidly, raising the two-month toll of air deaths above the 150 mark.

Pilots, management and potential passengers were demoralized. It seemed that the curtain was going down on a glamorous, dramatic segment of aviation history.

Instead, civil aviation in China has made its greatest strides. Today, it is the healthiest activity in all this troubled land.

Credit for keeping China flying belongs largely to three men: Bill Bond, long-time foreign driving force behind China National Aviation Corp. (CNAC); Moon Chin, CNAC-trained founder of Central Air Transport Corp. (CATC); and Lt. Col. Tai An-kuo, young first commissioner of China's civil aviation.

CNAC, which had five of the crashes, was in a real slump when Bond came rushing back to China late last winter. He started cleaning house immediately. There have been many changes in personnel during the year so that the line is now shaken down to the operating efficiency and stability for which it had been long famous.

CATC faced harder sledding than CNAC. Equipment-wise, especially in maintenance shops, it is far behind. Chin has kept his operation on the beam and claims record cargo and passenger increases for the year.

Lion's share of the credit belongs to Commissioner Tai. Despite shortages of personnel, funds and equipment, and an oversupply of Chinese politics, he started installing some system and regulation to commercial air operations.

An outstanding achievement was the installation of night landing equipment at Lunghwa. Lack of this equipment frequently jammed up international air carriers. For instance a plane arriving at Tokyo from the U. S. after 1 p.m., could not proceed immediately to Shanghai because it would arrive after nightfall. Consequently it would have to lay over until 2 a.m.

Passenger handling by the airlines also shows definite improvement. Processing of tickets, baggage, customs and police clearances is far superior to last year when getting into the milling mass at the small terminals was hazardous. Also, there is a fair chance of getting aboard a slightly plushed up plane. Bucket seats are still plentiful but are less frequent than before.

CATC will take delivery of six Convairs next year. In addition it has purchased six DC-3s from Northwest Airlines and is converting some of its C-46s and C-47s. When this expansion is completed the line will begin to give CNAC some real competition for passenger business. Prior to last June, Moon Chin had not seriously gone after passengers.

* * *

Statistic-wise, CNRRA Air Transport (General Chennault's airline) piled up an impressive record during the latter part of 1947. However, it is not fair to use the figures for comparison with CNAC or CATC.

CATC operated on a radically different basis from the two government operators. It did not have to maintain strict routes and schedules. While the other lines were having difficulties clearing imports of needed parts and equipment through the import licensing board and customs, CATC was able to bring things in with United Nations Relief and Rehabilitation Administration immunity to governmental red tape.

Furthermore, Chennault's personal friendship with Generalissimo Chiang Kai-shek has made it less difficult to obtain dollar foreign exchange from the Central Bank of China. Whether it will help Chennault obtain a permanent franchise for his airline remains to be seen.

The Ministry of Communications and CATC and CNAC (both government owned) are not overly anxious for a third airline. It isn't that China can't use more transportation, but it is a question whether China can afford more than the two airlines now permanently franchised.

* * *

CNAC still sits on a decision on new aircraft. For China operations, it claims the C-46 is the best aircraft ever designed. Consequently it will withhold any new orders in the hope that an airplane with similar characteristics will be developed.

AIR TRANSPORT

PCA Bolstered by New Routes In Boston-New Orleans Decision

CAB gives carrier much-coveted southward extensions to New Orleans, Mobile and Atlanta; recent economies brighten financial outlook.

By CHARLES ADAMS

Working swiftly after undergoing its second major expansion in four months, Capital Airlines (PCA) is pushing plans for early integration of two newly-acquired southward extensions into a network which now includes more than 5,000 miles.

CAB's decision in the long-pending Boston-New York-Atlanta-New Orleans case found PCA the main beneficiary. The board awarded the carrier a much-coveted 348-mile link from Birmingham, Ala., to New Orleans via Mobile, and a second extension from Bristol, Tenn.-Va., to Atlanta, Ga., via Asheville, N. C.

▶ **Bids Denied**—In designating PCA for the new routes, CAB rejected the applications of American, Chicago & Southern, Colonial, Delta, National and Northeast for extensive new services in the Boston-New Orleans area. Eastern Air Lines vigorously opposed all of the applications, asserting that substantial traffic would be diverted from its existing Boston-New Orleans route.

While denying Delta's bid for a New York-New Orleans operation, CAB granted the carrier a 176-mile extension from Meridan, Miss., to New Orleans via Hattiesburg, Miss.

▶ **The Prospects Improve**—CAB's latest awards to PCA coincided with additional evidence that the carrier is pulling out of the financial crisis which beset it a year ago. The company announced last week that its cash balance on Dec. 31 was $3,432,000—the highest level since October, 1946.

Reflecting major economy moves, PCA cut its expenses during the last quarter of 1947 to $5,158,000, compared to $5,850,000 in the same 1946 period. Revenue increased from $4,466,000 during the final quarter of 1946 to $5,102,000 in the last three months of this year.

▶ **Losses Cut**—Net loss for the last quarter of 1947—about $190,000—will be in sharp contrast to the $1,817,000 deficit suffered in the comparable three months of 1946.

Most observers feel that the new southward extensions will be a far greater asset to PCA than the Milwaukee-Twin Cities link granted last Sept. 30. PCA president J. H. Carmichael said the most recent additions will materially strengthen the pattern of his company's entire operation.

▶ **The Diversion Estimated**—Eastern has estimated that it may lose 16 percent of its Boston-New Orleans traffic to the new PCA operations. PCA, which flew about 288,500,000 revenue passenger miles in 1947, expects to generate 82,000,000 additional passenger miles annually over existing portions of its system because of the new links.

CAB denied allegations that PCA will be unable to perform the newly-authorized service because of recent financial difficulties. The board pointed out that the carrier will have to establish only three new stations (at Atlanta, Mobile and New Orleans) and added that little if any new flight equipment will be required.

▶ **Better Anchors**—New Orleans and Atlanta—the two largest cities in the deep South—will give PCA more solid anchors for its system, CAB declared.

PCA already has survey teams studying the Atlanta and New Orleans operations. Inauguration of service is expected in the early spring.

New Jet Transport

First Canadian built and designed commercial jet transport will be ready for test flights by February or March, 1949, according to A. V. Roe (Canada) Ltd., Toronto. Construction of prototype is now well under way. Work on production models of the aircraft for sale is expected to start in 1950.

The C-102 jet transport is a commercial short distance aircraft, designed primarily for transcontinental service with stops. It is not designed for transocean service and could not be used for inter-American over-water services, AVIATION WEEK was told. Aircraft will seat 36 to 40 passengers, and will be powered with four Rolls Royce Derwent engines, each developing 3500 lb. thrust.

CONVAIR DELIVERY FLIGHT

First NX-licensed Convair-Liner to be delivered to a customer recently arrived at American Airlines' training center at Ardmore, Okla., after a flight from San Diego, Calif. Pictured left to right are American and Convair personnel making the flight to Ardmore: O. W. Harper, Convair service department; A. Anderson and M. E. Williams, American ground maintenance instructors; G. T. Hayes, American's Convair-Liner manager; Lemuel Duffield, AA mechanic; Pilot W. B. Harwell, Consolidated Vultee; E. M. Beattie, American engineering pilot; First Officer W. A. Miller, American; Captain Glenn Brink, AA acceptance pilot; K. A. Griffin, American communications representative; C. E. Bailey, AA mechanic; and Richard Parsons, American engineering representative.

California Accident Stirs New Probes

The question mark surrounding the safety standards of uncertificated passenger-carrying airlines has again been spotlighted following the crash of a chartered plane on the West Coast and new developments affecting East Coast operators.

Thirty-two persons were killed when a DC-3—which CAA said was operated by Airline Transport Carriers, Inc., Burbank, Calif.—crashed near Coalinga, Calif. Twenty-eight Mexican deportees, a United States Immigration Service Guard, and a crew of three were aboard the plane.

▶ **Flight Canceled**—While there was no intimation that the carrier had violated safety regulations, repercussions were immediate. Immigration service canceled at least one other similar charter flight, thus presenting the possibility that this particular type business may be lost to uncertificated companies in the future.

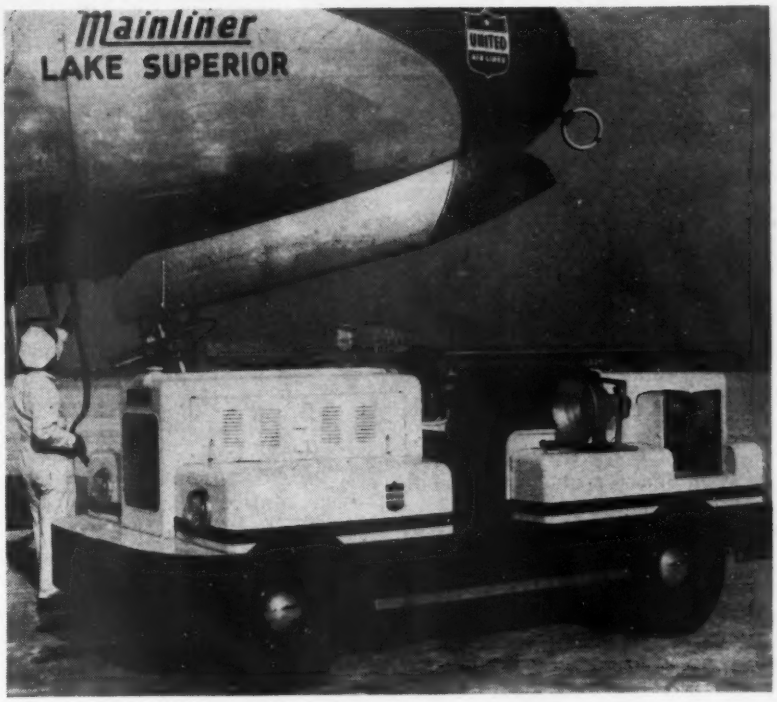
Representative Charles A. Wolverton (R., N. J.) demanded a thorough investigation of the accident, which was probably the worst domestic charter plane mishap to date. The Air Transport Association also launched a probe to determine if the California crash was part of the same pattern of low safety standards which has marked uncertificated operations on the East Coast.

▶ **Miami Incident**—Shortly after the Coalinga accident, it was reported that ten Puerto Ricans were stranded at Miami when their chartered plane, en route from New York to San Juan, was grounded by CAA on 19 separate counts. After boarding a second chartered plane, they were reportedly forced down in Bahama Islands by engine trouble.

Meanwhile, CAB was holding a hearing in Philadelphia on the Coastal Air Lines accident near Savannah, Ga., early in January (AVIATION WEEK, Jan. 19). One CAB investigator testified at the hearing that there was evidence that Coastal's operation was "sloppy." Previously CAA reported that Coastal had been cited for violating regulations on three occasions.

British South American Airways Gets Permit

British South American Airways has been issued a foreign air carrier permit to operate between Jamaica, British West Indies, and Miami, Fla., via Nassau, Bahama Islands, and Bermuda. The company intends to make three roundtrips weekly between Jamaica and Miami, each flight via Nassau.



POWER ON THE GROUND

This mobile powerplant designed by United Air Lines is one of five being placed in service by the carrier. Capable of generating 1,000 amperes, the heavy-duty units also can be used in towing planes. They are equipped with two powerful floodlights which can be detached from the vehicle and extended about 50 ft. The powerplants are manufactured by Motor Generator Corp., Troy, Ohio.

BSA currently flies from London to points in the Caribbean, South America, Bermuda and the West Coast of Africa. In addition it has a local service between Caribbean points and the Northern part of South America. The carrier owns 15 aircraft, of which ten are 21-passenger Avro Yorks, three are 13-passenger Lancastrians, and two are 32-passenger Tudor IV's. Avro Yorks will be used on the Jamaica-Nassau-Miami run.

Airlines to Share Military Traffic

The knotty problem of whether certificated or contract carriers should be given military business involving mass air transportation of civilian personnel to overseas points has been resolved at least temporarily by Secretary of the Air Force W. Stuart Symington.

Decision on the basic issue was forced upon the Air Force as a result of the Air Transport Association's insistence that Northwest Airlines and Pan American Airways carry all of the 2000 dependents of Army personnel involved in the movement from the West Coast to Tokyo, Okinawa, Manila and Guam (AVIATION WEEK, Jan. 26). The Air Force had proposed dividing the traffic among the two certificated lines and two large uncertificated operators—Pacific Overseas Airlines and Transocean Air Lines—both of which have excellent safety records.

Symington decided that the certificated airlines should be given as many of the 2000 passengers as they can handle on their regularly-scheduled flights without putting on extra sections. The remainder of the business will be contracted for among uncertificated carriers.

The Air Transport Association, unsatisfied with the Air Force's position, plans to take the matter up with the government's Air Coordinating Committee, which includes representatives of the State, Commerce and Post Office Departments, the Army and Navy, CAB and the Bureau of the Budget. ATA states that the Air Force is undermining the certificated airlines by dealing with "cut-rate" uncertificated carriers. Investigation of ATA's allegations is planned by the joint Congressional Aviation Policy Board.

Case Reopened

With Member Josh Lee dissenting, CAB has agreed to reconsider that part of its Middle Atlantic area decision of Sept. 30, 1947, which denied Eastern Air Lines' application to add Pittsburgh as an intermediate point on its Detroit-Miami route.

Battle Renewed On Back Mail Pay

The battle for more than $16,000,000 in retroactive mail pay broke out anew late last month as TWA and Capital Airlines (PCA) petitioned CAB for reconsideration of an opinion handed down last December (AVIATION WEEK, Dec. 15).

Hopes that CAB will reverse itself on the basic policy decision against retroactive mail pay apparently rest to a considerable extent on the changed complexion of the Board. TWA and PCA contend that CAB was in error when it said it lacked the power to grant payments dating back beyond the time the petition for a mail rate adjustment was filed.

▶ **Lee Dissents**—Last December's majority opinion was rendered by former Chairman James M. Landis, Vice Chairman Oswald Ryan and Member Harllee Branch. Member Josh Lee dissented vigorously.

It is possible, TWA declared, that incoming members of the Board will disagree with the Landis-Ryan-Branch decision. After May 1, only Ryan, among the three, will remain on CAB.

▶ **Opinion Flayed**—TWA said that never before had a CAB opinion been so carelessly prepared or contained such glaring inconsistencies. To its previous statements, TWA added that "the entire decision was characterized by misstatements, propaganda and obvious partisanship toward the conclusion desired to be reached."

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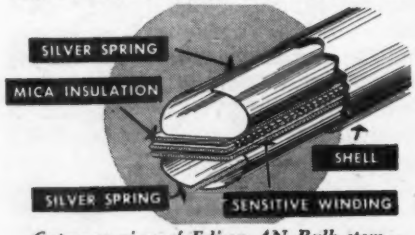

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Hughes-TWA Pact Gets CAB Scrutiny

Finding that the Hughes Tool Co.-TWA financing agreement of Jan. 8, 1947, resulted in an immediate increase in the tool company's control of the air carrier, a Civil Areonautics Board examiner has recommended that the Board hold further hearings in order to determine whether the additional control is consistent with the public interest.

The agreement provided for a $10,000,000 loan by the tool company to TWA in exchange for TWA notes convertible into shares of the carrier's common stock. It also made provision for reconstitution of the TWA board of directors.

▶ **Stock Interest**—As of Jan. 1, 1947, immediately prior to the agreement made between the two companies, Hughes Tool Co. owned 46.1 percent of TWA's outstanding capital stock. The tool company, in turn, is wholly owned by Howard Hughes.

In 1944, CAB approved Hughes' control over TWA. At that time the tool company held about 45.6 percent of TWA's outstanding stock.

▶ **Rights Granted**—CAB examiner Edward T. Stodola said the agreement of Jan. 8, 1947, was the means chosen to reorganize TWA and to save it from bankruptcy. But he noted that it gave Hughes Tool Co. the "inalienable right" to acquire up to an 80 percent stock interest in TWA.

Stodola declared that reconstitution of TWA's board of directors following the agreement gave Hughes Tool Co. unquestioned domination of the carrier's management for the first time. He added that a two-thirds common stock interest in TWA would enable the tool firm to use its voting power to bring about merger, consolidation or dissolution of the carrier—and in effect gave Hughes "life or death power" over TWA.

REA-NWA Pact Rejected

CAB has disapproved a Railway Express Agency-Northwest Airlines agreement under which REA would have extended its activities into the airfreight field. The Board said the pact—signed in April, 1946—did not come under the exemption which was granted by the CAB to REA's air express operations in 1941.

Baker Turns Down CAB Chairmanship

President Truman's quest for a new CAB chairman to succeed James M. Landis has gone into its second month following unsuccessful efforts to obtain George P. Baker, director of Harvard University's School of Transportation, for the post.

Baker, a former CAB member and recently vice chairman of the President's Air Policy Commission, refused the Board appointment because of the inadequacy of the $10,000 annual salary. Harvard offered to augment Baker's government income by giving him weekend teaching assignments, but White House press secretary Charles G. Ross said the law specifically prohibits CAB members from engaging in other business activities.

The continuing spectacle of the CAB chairmanship going begging gave new force to the Air Policy Commission's recommendation that salaries of CAB members be increased to $15,000 annually. The Civil Aeronautics Act provides that CAB members should receive $12,000 a year, but Congress has not appropriated sufficient funds to pay them more than $10,000.

TCA to Fly Displaced Persons to Dominion

Mass transportation of displaced persons from Europe to Canada is to be started shortly by Trans-Canada Air Lines. Using DC-4M aircraft, TCA plans to make four trans-Atlantic flights daily, carrying 160 passengers every 24 hours.

The International Committee on Displaced Persons is to pay the equivalent of ship passage for the air transportation, with industrial concerns paying the balance of the plane fare. Canada is bringing 20,000 displaced persons from Europe, 8000 of whom have already arrived by ship.

CAB SCHEDULE

Feb. 9. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)

Feb. 9. Hearing on reopened Kansas City-Memphis-Florida case. (Docket 1051 et al.)

Feb. 10. Oral argument in reopened Kansas City-Memphis-Florida case. (Docket 1051 et al.)

Feb. 16. Hearing on Willis Air Service's U. S.-Puerto Rico exemption request. (Docket 3141.)

Feb. 21. Hearing on Mid-Continent's Minot, N. D.-Regina, Saskatchewan, route case. (Docket 628.)

Mar. 15. Hearing on additional service in Hawaiian Islands. (Docket 2390 et al.)

May 15. Hearing on Capital Airlines (PCA) mail rate case. (Docket 484.)

Continental Reports Profit During 1947

Continental Air Lines, one of the few domestic carriers in the United States to operate in the black during 1947, has reported a net income of $116,411 (43 cents on each common share) for the year as against a profit of $17,939 in 1946.

The carrier started 1948 with a 14-year record of 700,000 passengers flown without fatality or injury.

▶ **Cargo Increases**—President Robert Six said airfreight and express volume reached a new peak, but passenger traffic and revenue dropped 14 and 19 percent, respectively, compared to 1946. A total of 175,976 passengers were flown 58,924,510 revenue passenger miles in 1947 compared to 204,560 passengers and 75,618,738 revenue passenger miles in 1946. Passenger revenue fell from $3,718,740 in 1946 to $3,005,426 in 1947.

Freight ton miles climbed from 71,684 in 1946 to 137,133 in 1947, while express increased from 73,264 to 85,488 ton miles. Plane miles flown declined from 5,628,165 in 1946 to 5,320,624 in 1947.

▶ **Convair Deliveries**—CAL President Six said that new equipment to be placed in operation around the middle of the year, together with recent increases in passenger fares and mail rates, presents an optimistic outlook for 1948 provided costs stabilize. The company expects delivery on the first of five 40-passenger Convair-Liners next month.

Christenson Appointed UAL Safety Engineer

Capt. Carl Christenson, United Air Lines pilot since 1933, has been named flight safety engineer for the company. The move followed shortly after Western Air Lines' anouncement that it had appointed a director of safety in accordance with recommendations made recently by President Truman's special Air Safety Board (AVIATION WEEK, Jan. 26).

J. A. Herlihy, United's vice president-operations, said Christenson will devote full time to technical problems in connection with safety of operations, particularly with reference to new equipment. He will have headquarters in Denver.

Other personnel developments include the following:

• **Braniff**—G. C. Younie has become chief maintenance engineer.

• **National**—Charles E. Banks has been named director of aircraft overhaul, and Harry S. Eads has been appointed director of engine and accessory overhaul.

• **Peruvian International**—Clinton R. Harrower has become director of public relations.

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Caribbean-Atlantic Gets Sliding Scale Mail Pay

For the fourth time in seven months the Civil Aeronautics Board has established an airline mail rate geared to the rise and fall in the carrier's passenger load factor.

Latest company to receive sliding scale mail payments is Caribbean-Atlantic Airlines, San Juan, P. R. The formula was first applied to Pioneer Air Lines last July, to Continental Air Lines in December and to Colonial's Bermuda run in January (AVIATION WEEK, Jan. 26).

Operating within Puerto Rico and to the Virgin Islands, Caribbean-Atlantic will receive $145,646—equal to 33.53 cents a plane mile—for the 13-month period ended Oct. 31, 1947. After Nov. 1, 1947, the carrier will get 44 cents a plane mile when its monthly passenger load factor is 50 percent.

For each one percent rise in load factor above 50 percent, the mail rate will decrease 1.3 cents a plane mile down to a minimum of 11 cents a mile. When the load factor is under 50 percent, the maximum mail rate of 44 cents a plane mile will apply. At a 50 percent load factor, the carrier can earn an estimated 8 percent profit on its investment, while with a 70 percent load factor it can earn 23 percent profit despite the lower rate of mail pay.

CAB criticized Caribbean-Atlantic for having too many employes and refused to recognize the excess personnel for mail rate-making purposes. The Board also refused to recognize the carrier's third DC-3 for rate-making purposes, stating that two planes were sufficient for the company's operations. As a result of the ruling on these expenses, the $145,646 authorized for the 13-month period ended Oct. 31, 1947, will not wipe out the carrier's $157,456 operating loss.

Mid-Continent Edges Into Black in 1947

Despite a $34,975 deficit during December, Mid-Continent Airlines finished 1947 with an unaudited net profit of $46,696 after taxes (12 cents a share on outstanding stock) compared with a $262,066 profit in 1946.

The 1947 figures do not include mail revenue for the 11-month operation of the Tulsa-Houston route, since CAB has not yet set a rate for this link. Total operating revenue for the year reached a record $5,571,825—14 percent above the 1946 level. Operating expenses increased 22 percent.

MCA carried 269,189 revenue passengers 81,983,036 passenger miles in 1947, against 249,626 passengers and 75,570,341 passenger miles in 1946. Passenger load factor dropped from about 72 percent in 1946 to 62 percent last year. Revenue miles flown increased nearly 25 percent to 6,584,336, while mail, express and freight ton miles rose from 350,990 to 496,189.

Terminal Theater Ready At Willow Run Airport

First unit in a proposed nationwide system of air terminal theaters has been completed at Willow Run Airport by Airlines Terminal Theaters, Inc., Detroit.

Featuring newsreels and selected short subjects, the theater also has a visible announcement system using a small screen alongside the motion picture screen. By this means, all dispatcher information regarding flight arrivals and departures and individual calls are flashed on the screen as soon as they are announced by the loudspeaker within the terminal itself.

Entrance to the Willow Run airport theater is directly off the terminal lobby area and is convenient to airline ticket counters, loading gates and telephones. Theater capacity is under 200.

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SHORTLINES

▶ **Alaska Coastal Airlines**—Temporary mail pay on and after Sept. 22, 1947, has been fixed by CAB at 45 cents a plane mile.

▶ **American**—During 1948 expects to boost its seat mile capacity 15 percent by changing over its entire passenger fleet to DC-6s and Convair-Liners.

▶ **British South American Airways**—Has received CAB permission to serve Miami through Miami International Airport starting this month.

▶ **Eastern**—Has let contracts totaling $500,000 for materials to be used in its $1,000,000 line maintenance building to be erected this year at Miami International Airport.

▶ **Northwest**—Plans to start service into Washington, D. C., within "a few weeks." A new traffic office at 1510 H St. is to be completed sometime next month.

▶ **Pan American**—Has added a third weekly Constellation flight to Calcutta, India.

▶ **Piedmont Aviation**—CAB has denied State Airlines' petition that the effectiveness of Piedmont's feeder certificate be stayed pending court review of the legality of the Board's award (AVIATION WEEK, Feb. 2). With flights scheduled to start this month, CAB granted Piedmont permission to suspend service temporarily (because of airport conditions) at Ashland, Ky.; Huntington, W. Va.; Beckley, W. Va.; Charlottesville, Va.; Fayetteville, N. C.; London-Corbin, Ky.; Middlesboro-Harlan, Ky.; Portsmouth, Ohio; and Princeton-Bluefield, W. Va.

▶ **Trans-Canada**—Expects to inaugurate shortly two flights daily between Montreal and Vancouver with pressurized DC-4M2 aircraft. Stops on the express run will be made at Toronto, Winnipeg and Calgary.

▶ **TWA**—Estimates that a one percentage point variation in load factor during 1948 will mean a difference in revenue of $900,000 domestically and $700,000 on the company's international system. . . . Carrier plans to inaugurate a new weekly all-cargo service between New York and Geneva, Switzerland, on Mar. 1.

▶ **Western**—Has consolidated ticketing, reservations, passenger handling and other facilities at Salt Lake City with those of Monarch Air Lines. The two carriers will continue to have separate maintenance, traffic and sales departments, however.

▶ **Wisconsin Central**—CAB has authorized temporary suspension of service at 21 of WCA's 34 points largely because of inadequate airports. The feeder is to begin operations this month.

SEARCHLIGHT SECTION

(Classified Advertising)

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Bids: February 16, 1948

PREFABRICATED AIRPLANE HANGAR

ON MOTION, NOTICE IS HEREBY GIVEN that the County Commissioners of Snohomish County, Washington, will receive bids for a prefabricated airplane hangar to be erected at Paine Field, Snohomish County, Washington. Hangar to conform to the following specifications:—

Size: Approximately 200 ft. deep by 200 ft. wide (Including Lean to shops)

Doors: Approximately 160 ft. wide by 26 ft. to 30 ft. high.

Lean to shop each side of building, 20 ft. wide by 200 ft. long, with adequate natural lighting.

Frame to be all steel with metal or fire-proof or fire resistant covering.

Foundations and floor will be provided by Snohomish County.

Plumbing, heating and lighting fixtures desirable.

Material must be in good condition and be free of rust and corrosion.

Seller must guarantee that all parts are provided and will fit.

Full details of proposal to be submitted with bid.

Must be available immediately.

Bids will be accepted for hangar "where is," "as is" or erected on Paine Field. Bids must be accompanied by complete detail drawings and information. If bid does not include erection, complete detailed drawings with piece markings must be furnished, with complete information for erection.

The Board of County Commissioners reserves the right to inspect any hangars offered after bids have been received and opened. Successful bidder will be based upon both price and hangar offered. The Board reserves the right to reject any and all bids.

A performance bond pursuant to Washington State Law is required in full amount of bid. (See Remington's Revised Statutes, Vol. 3, Section 1159)

A certified check for 10 percent (10%) of the bid price must accompany bid.

Bids will be opened on Monday, February 16, 1948, at the hour of 2:30 o'clock P. M., at the office of the County Commissioners, Snohomish County Court House, Everett, Washington.

Passed in regular session this 19th day of January, 1948.

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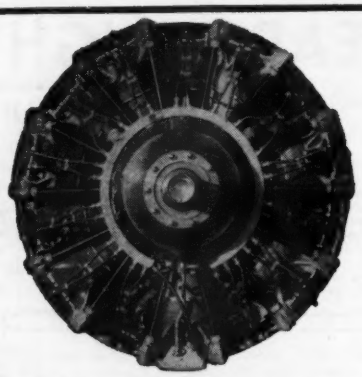

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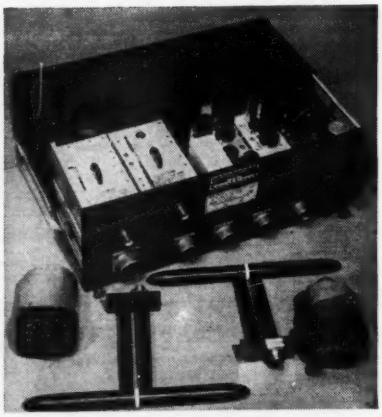

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EDITORIAL

The Genius of the Wright Brothers

(Alexander McSurely, associate editor of Aviation Week, *is a former Dayton newspaperman. He was a friend of Orville Wright, and contributed this tribute to Orville and his brother, Wilbur)*

A large portion of the world has never fully recognized the full scope of the inventive genius of the Wright brothers. This has been due partly to the shy, retiring nature of Orville and Wilbur Wright, and to the fact that their scientific background was acquired through home study of available aeronautical knowledge, coupled with laboratory and flight experimentation, instead of through matriculation at a college or university.

Even after the recent death of Orville Wright, some editorials hurriedly written, and obituaries quickly pulled out of the old newspaper morgue envelopes, too frequently gave the impression that the Wrights were a lucky pair of bicycle mechanics to succeed in flight, when other more educated men had failed before them.

Actually the Wrights were the best aeronautical engineers of their time. The first Wright power plane itself is the best proof that the Wrights had progressed well beyond the calculations of their contemporaries, and had substituted their ideas after finding that much so-called scientific fact of their period was in error.

Their first two gliders which were flown at Kitty Hawk, N. C., in 1900 and 1901 used wing designs based on the air pressure tables prepared by the German inventor, Lilienthal, and accepted as correct by Dr. Samuel P. Langley.

Performance of these gliders was so erratic that the Wrights nearly gave up the whole idea of trying to fly. But in the winter of 1901-1902 the Wrights built their own wind tunnel, probably the first in the world, in which they tested widely varied wing sections and developed their own pressure tables. In the fall of 1902 they returned to Kitty Hawk with a glider designed according to their own calculations, and flew it in nearly 1,000 flights, some covering distances of over 600 ft. Some of these flights were made against a 36 mile wind, which also proved the efficacy of their new wing-warping system for lateral stability and control.

The first successful power plane which first Orville and then Wilbur flew on Dec. 17, 1903, at Kitty Hawk, was a logical next step after the 1902 glider flights.

How far the Wrights were ahead of their U. S. contemporaries is shown by the fact that they had virtually no competition in the U. S. Army Signal Corps contract awarded for a military plane, as late as 1908-1909.

The original ideas of the Wrights were the basis of lengthy patent litigation finally adjudicated in their favor, after many attempts by Glenn Curtiss, Albert Zahn and others to break down their claims. Curtiss and Zahn finally used a remodeled version of the old Langley Aerodrome in 1914 in an effort to prove that it had been capable of flight before the Wrights had flown. But Orville Wright compared the remodeled plane with the original Langley plane as described in the Langley memoirs, and found a list of some 35 changes which had been made. Most important were three fundamental changes in the wings in camber, in leading edge shape and in increased aspect ratio, as well as strengthening the wings by reinforcing and trussing not used by Langley.

Years later the Smithsonian Institution publicly accepted the changes described by Orville Wright, and retracted earlier statements about the 1914 flights. At the same time, the Smithsonian expressed regret "that the Institution employed to make the tests of 1914 an agent who had been an unsuccessful defendant in patent litigation brought against him by the Wrights."

After the death of Wilbur Wright in 1912, his brother Orville continued making important aeronautical engineering contributions, including an automatic stabilizer, the first split type flap, and a highly efficient engine cowling which antedated by several years other more publicized cowlings. He participated in development of the first American guided missile, a gyro-guided flying bomb of World War I, built by the Dayton Wright Company.

He was an active member of the National Advisory Committee for Aeronautics from 1920 on, and his death prevented his receiving the President's Medal of Merit which was to have been presented to him in Dayton by General Carl Spaatz, Air Force chief of staff, for his services in World War II in NACA and on the National Inventors Council.

In the last few years there were indications that Orville Wright had asked for the eventual return of the first power plane from the South Kensington Museum in England, where he had sent it on loan in 1928 in protest against the Smithsonian Institution's statements about the Langley Aerodrome. At that time it was understood that the plane would remain in England permanently unless reclaimed in Orville Wright's life time.

If it is returned, it should without question be given "the highest place of honor" as the Smithsonian Institution recently pledged. But if it remains in England, it can carry out the predictions made by Orville Wright: "In a foreign museum this machine will be a constant reminder of the reason of its being there and after the people and petty jealousies of this day are gone, the historians of the future may examine impartially the evidence and make history accord with it."

—ALEXANDER McSURELY

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